Net LineDancer
User Guide

Version 14.06

LogicVein, Inc.

www.logicvein.com

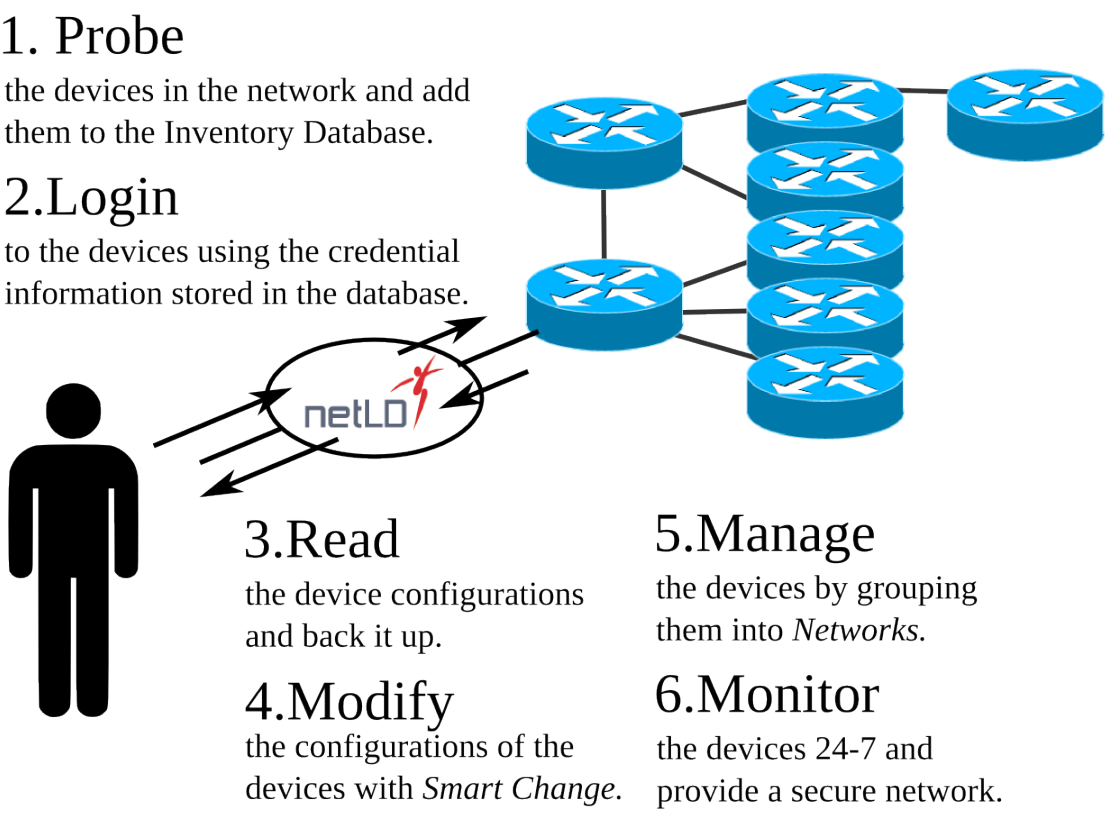
Mail: support@logicvein.com

July 22, 2014

Introduction

Thank you for purchasing our product lines Net LineDancer v14.06 (hereafter referred to as "netLD "). It reduces the effort of network device management and also increases the robustness, security and high availability of your networks, and we are very happy to help your job and to introduce you to such a product! To achieve the maximum speedup in your office in the least cost of time, please take a look at this introduction section first. It would be helpful how to read the manual and which section you should read in order to get the information right away.

Figure 0.1.1: Features in netLD.


1. Probe
the devices in the network and add them to the Inventory Database.
2.Login
to the devices using the credential information stored in the database.
netLD
3.Read
the device configurations and back it up.
4.Modify
the configurations of the devices with *Smart Change*.
5.Manage
the devices by grouping them into *Networks*.
6.Monitor
the devices 24-7 and provide a secure network.

0.1 What is netLD?

netLD is designed to help network engineers manage the configurations of the network devices e.g. routers or switches in their enterprises. Below is a brief summary of what netLD can do. (they are mainly described in *Basic Tools* Section.)

- Automatic detection of network devices in your network. Once you specify the range of IP addresses, you soon get the network devices as they are. This is helpful when you jump into an awful situation such as there is almost **no** reliable documentation on the device IP addresses and no one understand the current state of your network.
- Grouping, automated login and backup. You can group the devices so that the devices share the same login information within a group, and then you can reduce the effort to log in to each device. Once you registered the login information to the database, you can back up the configuration data in the devices.
- Fast & intuitive & automated access to the properties of each device. You can see, compare and restore the backed-up state of the devices in few clicks! Current states of the devices are shown in icons and you can easily find which device has a problem.
- If you have over the thousands of devices, you will find it painstaking to configure them because their configurations are *almost* the same but *have small variations* such as IP addresses and device names. We provide a scalable management method *Smart Change* on that purpose.
- And many other features, such as
  - Producing a summary report.
  - Automated detection and logging of changes in the configuration.
  - Automated error reporting to the other Network Management Systems.

All of these features are described in this manual, and the above list is incomplete. As you proceed through the manual, you will find many other useful features.

0.1.1 Target Audience

The target audience of this manual is the network administrators with minimum knowledge of managing the network devices such as routers and switches. We assume you are already familiar with IP network, concept of configurations of the devices, and sometimes CUI operation on both network devices and the server. However please do not worry, you do not have to be the master of all methods of managing the devices. We sometimes provide a helpful explanation even on the basic knowledge if we think it is necessary. As you progress through the manual, anyone new to the network management would get more familiar with what it is all about.

0.1.2 About this manual

The manual is constructed as follows.

1. First, we give tutorial sections that describe the basic installation method and the initial setup so that you can soon start managing the devices in your networks.

2. Then we give a concise explanation of various original concepts in netLD, for example, networks, credentials, etc, as well as most of the terms that we use throughout the manual such as the names of the UI elements. If you feel you are already good at those concepts you can skip this section.

3. Next, we proceed to the usage of the basic tools. They are easy to understand if you have a good understanding of some concepts and UI of netLD. However, since the UI elements are designed to be intuitive enough, you might already know how to use it even before reading this section.

4. We give further details of the advanced tools in our products such as *terminal proxy*, *Smart Bridge* or *Zero-touch*, which is necessary when you try to manage the large networks under many customers or you have to reduce the management effort on the remote networks.

5. The rest of the sections describe miscellaneous tools, tips, FAQs and default/internal data, which may sometimes help you solve the problem you will encounter during the operations.

Note that you can start from any section, especially if you are already familiar with our products by testing the trial version. This manual is composed for that purpose, and each section is composed so that it minimizes the dependencies between the chapters.

If you need further assistance or technical support about Net LineDancer, please fell free to contact below. We will be pleased to help you when you find any errors or ambiguities in this manual, or any questions regarding them as well. Please note that we are closed on weekends, national holidays, New Year and summer holidays in Japanese time. We accept e-mails for 24 hours but we will only reply on those business hours. Thank you for your cooperation.

LogicVein, Inc. Technical Support

Mail: support@logicvein.com

Finally, note that the descriptions in this manual are based on the version and the state of the websites on June 2014, and may be obsolete after some changes happen. Also we do not guarantee all or part of the contents in this manual maintain its accuracy.

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Chapter 1

Tutorial

Now we give a tutorial that helps you install our products. This chapter forms a full tutorial that is helpful when you first run the trial version of netLD. If you have a full manual and a tutorial, the contents are going to be exactly the same, so you can simply ignore the latter.

1.1 Getting netLD

For the users who first get this manual before getting the software, we provide a brief introduction to our website. Please understand that the website appearances are subject to changes. If you already have the software, you can safely ignore this section.

Following the tutorial here, you can get a free trial version of NetLD. The free version can later be upgraded to the full version by adding a license file. Firstly, navigate on your Web browser (e.g. Google Chrome, Firefox, Internet Explorer) to `http://www.logicvein.com` , shown in the following pages. Follow the instruction in each figure and get the installer binaries which are usually named as `netld-Enterprise-<release-date>-<architecture>`.

If you are using a machine with 32bit Operation System, we are very sorry to inform you that netLD enterprise is not available for your system. You can alternatively get *Net StreetDancer*, the free version of the software where the maximum number of devices is smaller than those available in netLD. To run netLD, make sure you have the 64bit operation system.

Figure 1.1.1: This is LogicVein support page. Navigate to the *Product* highlighted in red.

Figure 1.1.2: Click on the green *Download* button in the middle of the page.

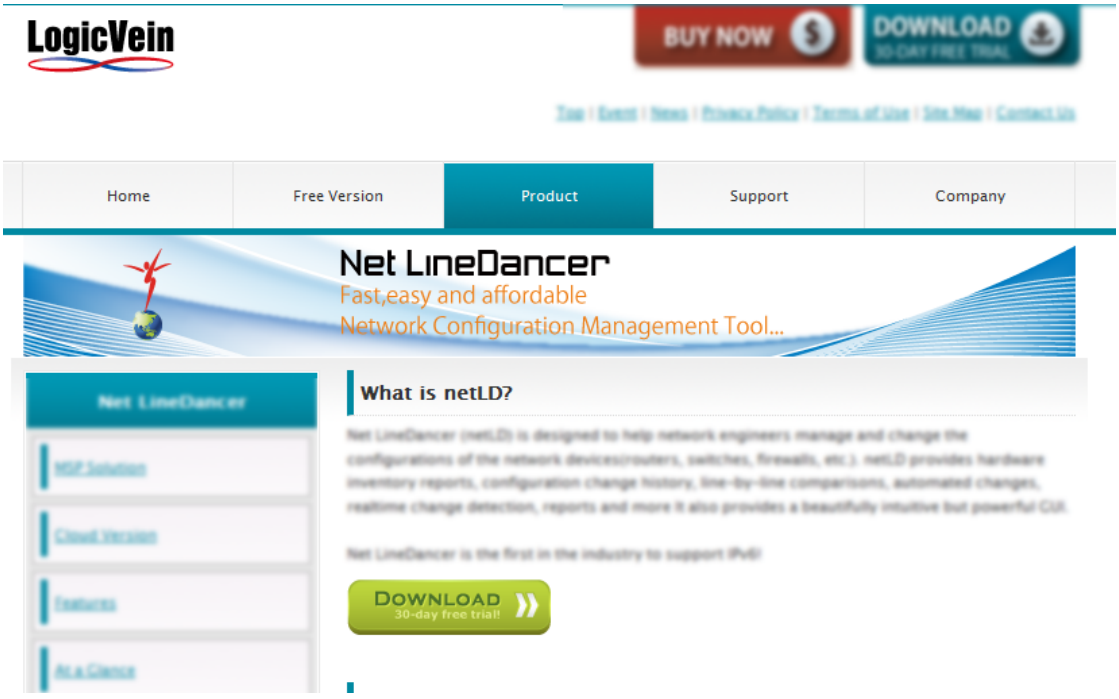

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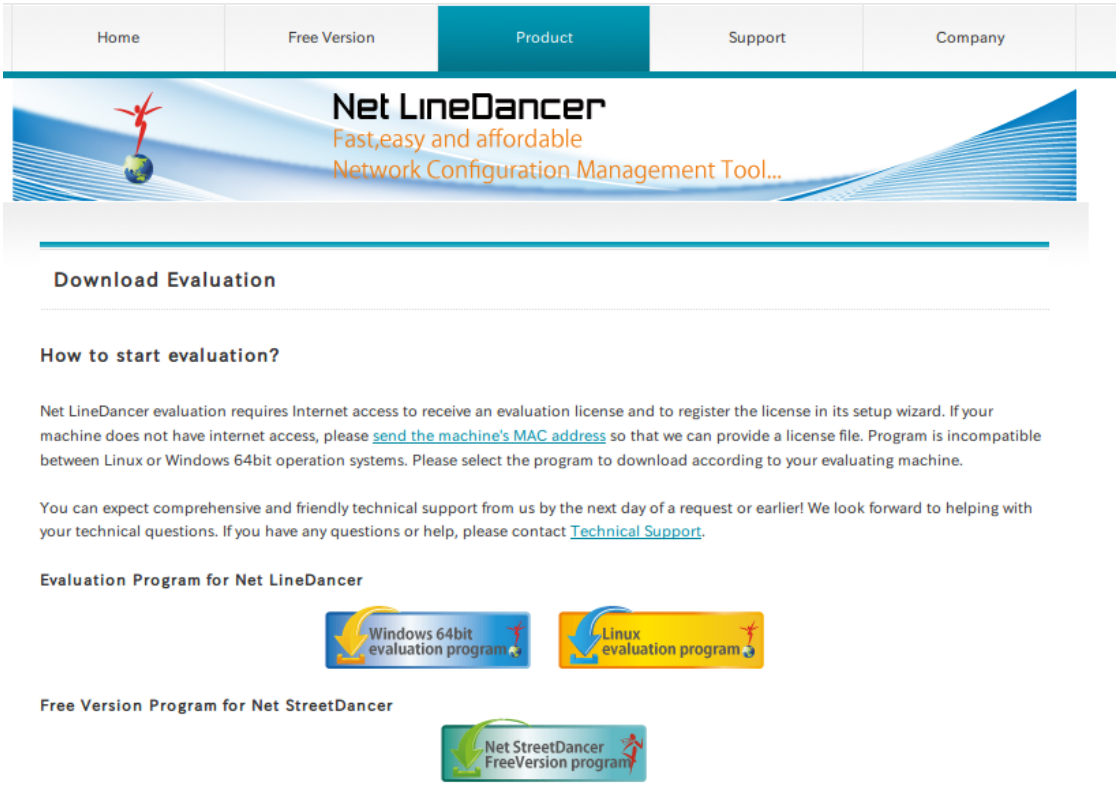
Figure 1.1.3: Finally, in this page, choose either Windows (64bit), Linux(64bit) or alternatively *Net StreetDancer* (32bit).


Home
Free Version
Product
Support
Company
Net LineDancer
Fast,easy and affordable
Network Configuration Management Tool...
Download Evaluation
How to start evaluation?
Net LineDancer evaluation requires Internet access to receive an evaluation license and to register the license in its setup wizard. If your machine does not have internet access, please send the machine's MAC address so that we can provide a license file. Program is incompatible between Linux or Windows 64bit operation systems. Please select the program to download according to your evaluating machine.
You can expect comprehensive and friendly technical support from us by the next day of a request or earlier! We look forward to helping with your technical questions. If you have any questions or help, please contact Technical Support.
Evaluation Program for Net LineDancer
Windows 64bit evaluation program
Linux evaluation program
Free Version Program for Net StreetDancer
Net StreetDancer FreeVersion program

1.2 Installing netLD

Once you get the software, let's install it! There are few notes before installing the software.

1. First of all, the installation should be done by the user with Administrator privilege (on Microsoft Windows). On Unix-like machines, you have to be able to log in as root user (or sudoers if sudo is set up in the system). Login again as the appropriate user.
2. Next, check the minimum requirements of the installation.
3. Third, check the install dependency and the programs that are simultaneously installed into the system and so on.

Minimum Requirements for 3,000 devices:

Operation Systems	
Windows(64bit only)	Windows Server 2008 SP2
	Windows Server 2008 R2
	Windows Server 2012
Linux(64bit only)	Cent OS 5/6
	RedHat 5/6 or later
Hardware Requirements	
CPU Core	Minimum 4
Memory	Minimum 2GB
HDD	120GB 10K RPM RAID1

On the Client side, you can browse Net LineDancer Server with:

- Internet Explorer 7 or later
- FireFox
- Safari

or the other conforming browser implementation.

Platform specific installation notes follow this section. Windows and Linux instruction is available. Read the appropriate pages. Instruction on Windows platform starts immediately after this section. Linux instruction starts in Sec. 1.2.2.

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1.2.1 Instruction on Windows

On windows, there is little or no software dependency on installing netLD. The installer sets up everything needed at the same time. These are the list of automatically installed software:

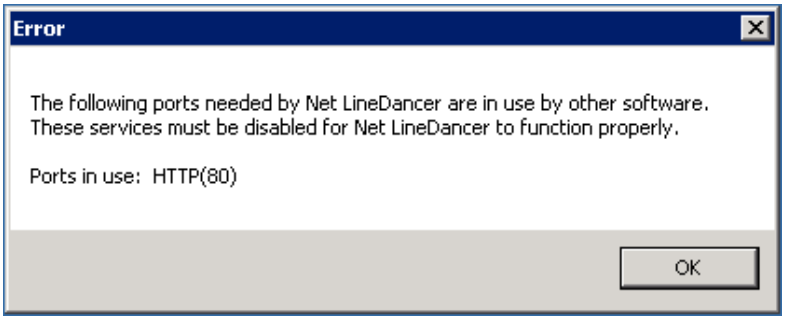
- **Adobe Flash Player v.10.3 or above**. Installation is system-wide.
- **Java7 SE Runtime Environment and ActivePerl**. Installation is package-local, so it does not conflict with the system-wide installation of Java environment or ActivePerl.

Now we provide a screen-by-screen instruction of the installation of netLD. It is straightforward if you are already familiar with standard installation process of windows programs. However, few things to note: we require the Internet connection to automatically certificate your license key, or you are required to run an additional process.

On the server, double-click on the netLD installer to start the installation.

Select a language to use from the drop-down menu and click on the OK button to start the Setup wizard.

After selecting language to use, NetLD checks the port usage. Following error message will show up if the installer find any applications using the required port.


Error
The following ports needed by Net LineDancer are in use by other software.
These services must be disabled for Net LineDancer to function properly.
Ports in use: HTTP(80)
OK

Click on the Next button to go to License Agreement dialog.

Net LineDancer Enterprise Setup
Welcome to the Net LineDancer Enterprise Setup Wizard
This wizard will guide you through the installation of Net LineDancer Enterprise.
It is recommended that you close all other applications before starting Setup. This will make it possible to update relevant system files without having to reboot your computer.
Click Next to continue.
Next >
Cancel

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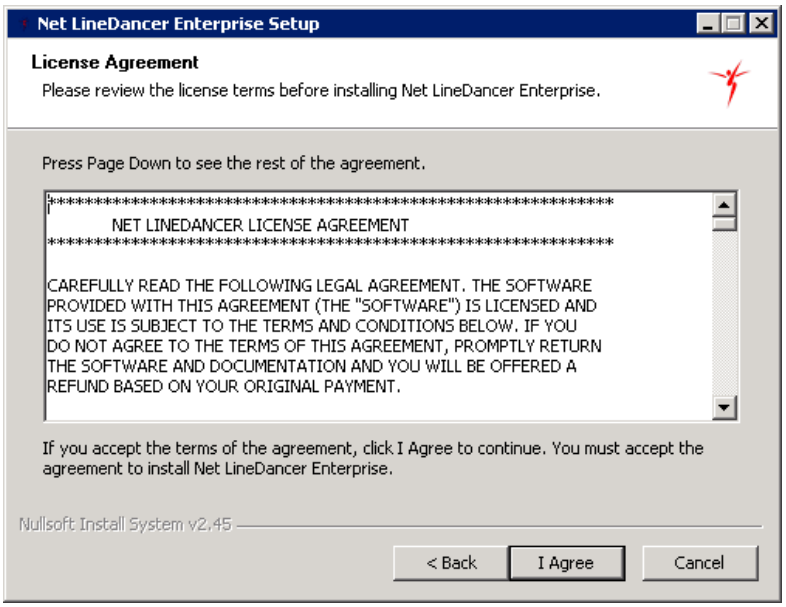
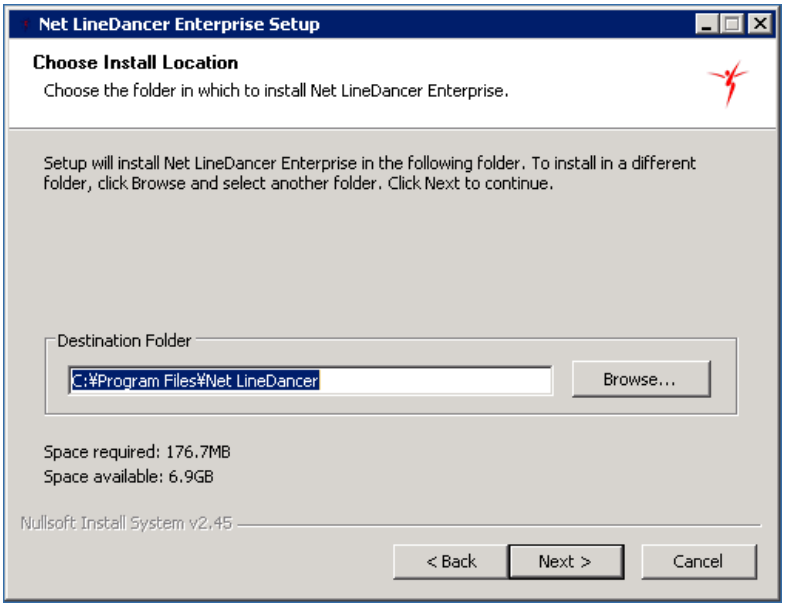
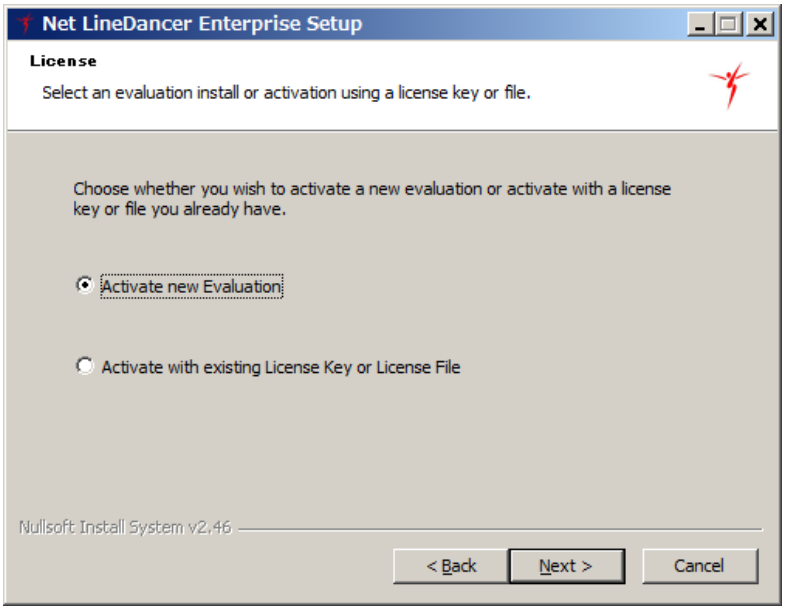
License Agreement dialog. Press page down key to read the rest of the agreement and click on the *I Agree* to continue.


Net LineDancer Enterprise Setup
License Agreement
Please review the license terms before installing Net LineDancer Enterprise.
Press Page Down to see the rest of the agreement.
NET LINEDANCER LICENSE AGREEMENT
CAREFULLY READ THE FOLLOWING LEGAL AGREEMENT. THE SOFTWARE
PROVIDED WITH THIS AGREEMENT (THE "SOFTWARE") IS LICENSED AND
ITS USE IS SUBJECT TO THE TERMS AND CONDITIONS BELOW. IF YOU
DO NOT AGREE TO THE TERMS OF THIS AGREEMENT, PROMPTLY RETURN
THE SOFTWARE AND DOCUMENTATION AND YOU WILL BE OFFERED A
REFUND BASED ON YOUR ORIGINAL PAYMENT.
If you accept the terms of the agreement, click I Agree to continue. You must accept the agreement to install Net LineDancer Enterprise.
Nullsoft Install System v2.45
< Back
I Agree
Cancel

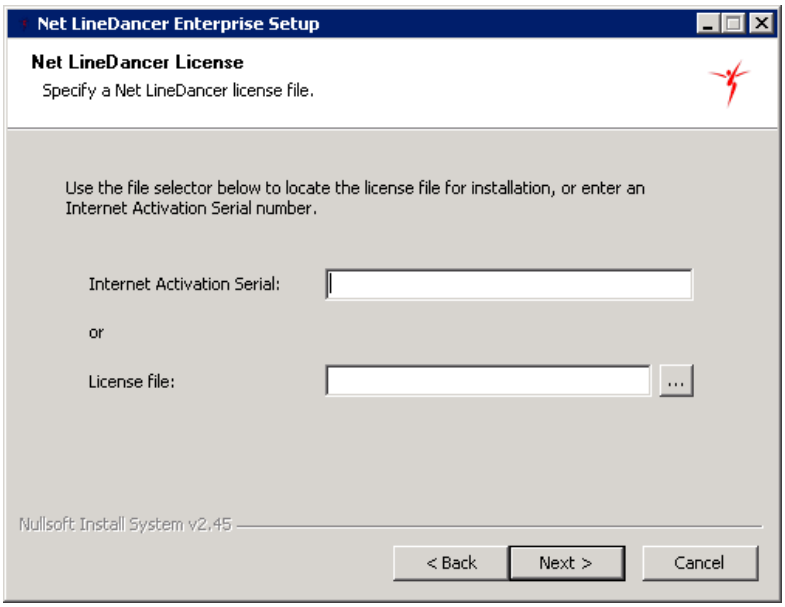
Specify the install directory by clicking Browse... button. Click on the Next button to continue.


Net LineDancer Enterprise Setup
Choose Install Location
Choose the folder in which to install Net LineDancer Enterprise.
Setup will install Net LineDancer Enterprise in the following folder. To install in a different folder, click Browse and select another folder. Click Next to continue.
Destination Folder
C:¥Program Files¥Net LineDancer
Browse...
Space required: 176.7MB
Space available: 6.9GB
Nullsoft Install System v2.45
< Back
Next >
Cancel

Choose the license. If you just want to try the trial version, choose *Activate Evaluation* and enjoy 30-days trial. If you already paid for our product and have a license key, choose *Activate with existing License Key or License File*.


Net LineDancer Enterprise Setup
License
Select an evaluation install or activation using a license key or file.
Choose whether you wish to activate a new evaluation or activate with a license key or file you already have.
Activate new Evaluation
Activate with existing License Key or License File
Nullsoft Install System v2,46
< Back
Next >
Cancel

If your environment is connected to the Internet, enter your serial number in the Internet Activation Serial field and click on Next. Otherwise, get a license file from us (support@logicvein.com), choose that file and click on Next. Note that the online serial authentication may fail under LDAP certification.


Net LineDancer Enterprise Setup
Net LineDancer License
Specify a Net LineDancer license file.
Use the file selector below to locate the license file for installation, or enter an Internet Activation Serial number.
Internet Activation Serial:
or
License file:
...
Nullsoft Install System v2,45
< Back
Next >
Cancel

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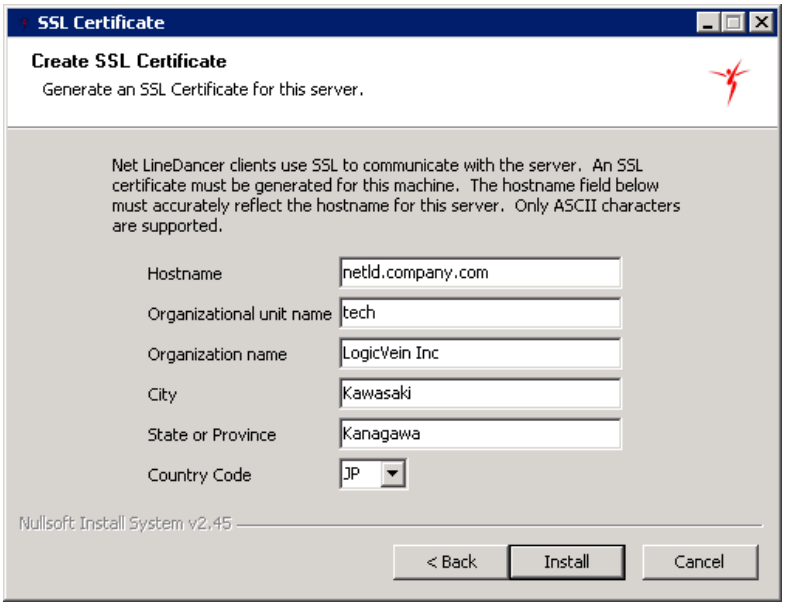
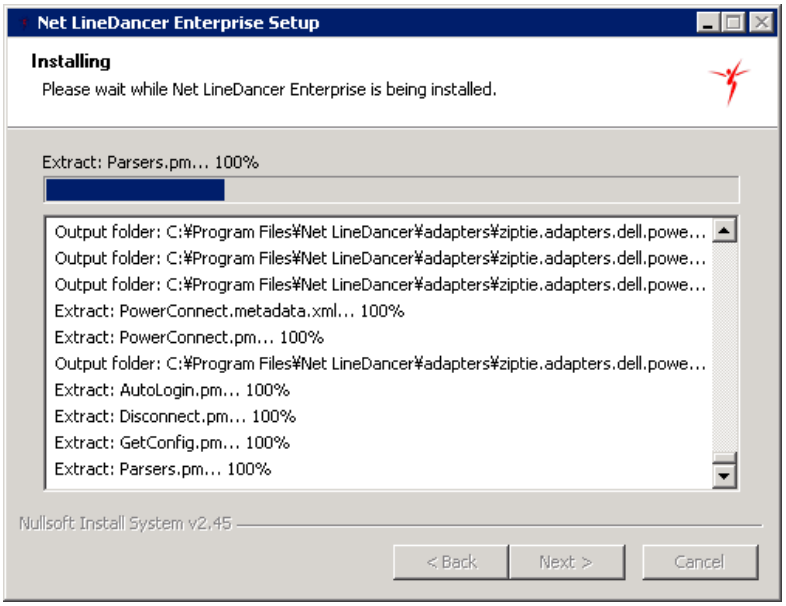
In the SSL Certificate dialog, enter the required information and click on the Install button. Information entered here can be edited after the installation. See Sec. 5.4.1 for details.

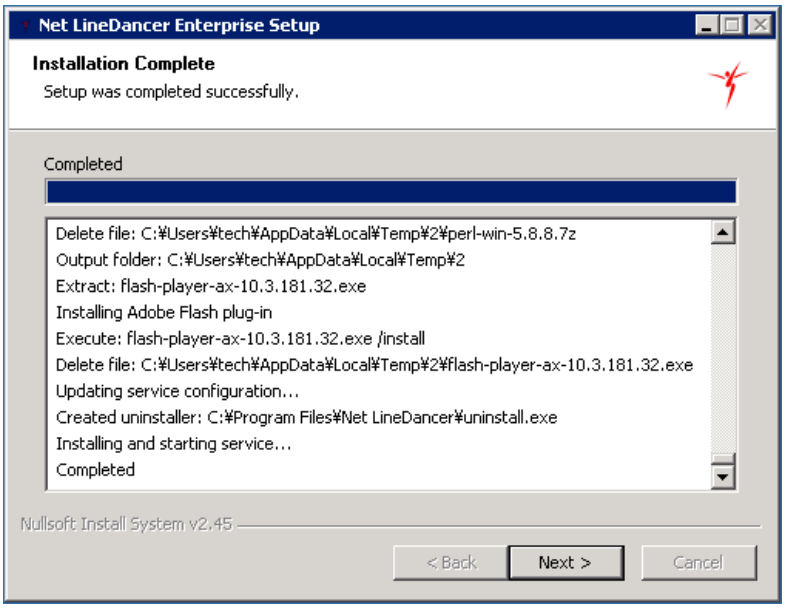


Installation continues.

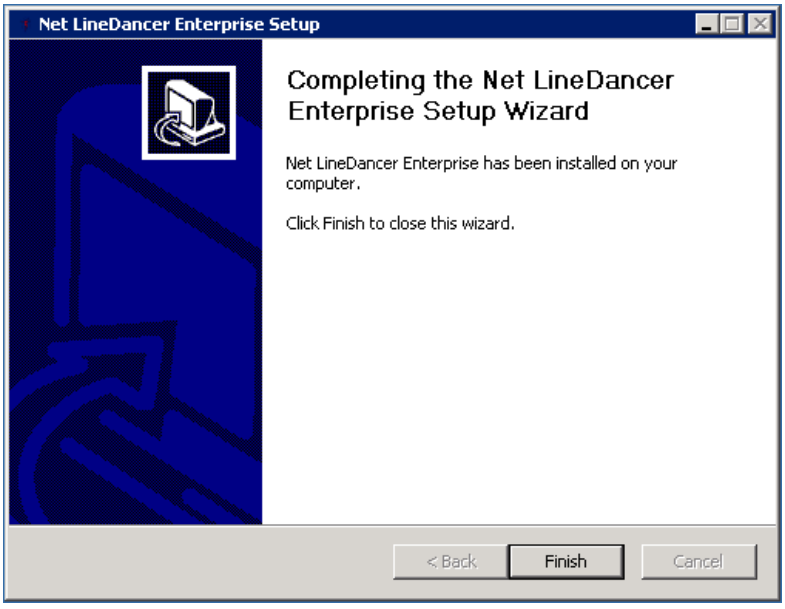


[1]NetLD authenticate the serial number via Internet, so the Internet connection is required in order to activate it. Without Internet connection, you have to obtain a static license file from us. Please contact support@logicvein.com . Also, when we issue a license file, we require the MAC Address of your server. MAC Address can be obtained by `ipconfig /all` (on windows CUI) or `ifconfig` (on UNIX-like systems). If the server has multiple NICs, we require only one of them.

Click on the Next button if Installation Complete dialog is displayed.



Click on the Finish button to close the setup wizard.


Net LineDancer Enterprise Setup
Completing the Net LineDancer Enterprise Setup Wizard
Net LineDancer Enterprise has been installed on your computer.
Click Finish to close this wizard.
< Back
Finish
Cancel

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1.2.2 Instruction on Linux family of OS

On linux-based systems, there are some software dependencies but they are automatically resolved by their package manager and our installation script. The dependencies are:

- Java7 runtime (`java-1.7-openjdk` package and alike).
- `openssl`
- `compat-expat1` (only needed on Cent OS 6.x)

Currently, only the systems with `rpm` are supported. These are for example *Fedora*, *Cent OS6*, *RedHat* and so on. If the system supports `up2date` or `yum`, the install dependencies are resolved automatically. If you find your system does not have those package managers, please contact support@logicvein.com . Note that you also have to set up the network connection in order to get the dependent packages from the remote `rpm` repositories.

We provide a self-containing installation binary named as `netld-2013.08.0-x86_64.bin` (which may differ depending on the version). Before the installation, make sure the binary has the executable flag on.

```
$ chmod +x netld-2013.08.0-x86_64.bin
```

If you have the superuser password, login as root and type as follows. Below, `$` means you are logged in as a regular user and `#` means you are now a superuser.

```
$ su
Password:
# sh netld-2013.08.0-x86_64.bin
```

then the installation starts. Alternatively, if your system has `sudo` installed and you are one of `sudoers`, then you can also type:

```
$ sudo sh netld-2013.08.0-x86_64.bin
```

You will see the package manager downloads the dependent packages via the Internet.

```
------------------------------------------------------------
-      Net LineDancer 2013.08.0 (r.20131127.1745) Installer       -
------------------------------------------------------------
java version "1.7.0_55"
Loaded plugins: fastestmirror, refresh-packagekit, security
```

```
Loading mirror speeds from cached hostfile
 * base: www.ftp.ne.jp
 * extras: www.ftp.ne.jp
 * updates: ftp.nara.wide.ad.jp
Setting up Install Process
...
...

================================================================
 Package      Arch          Version          Repository     Size
================================================================
Installing:
 netld        x86_64        2013.08.0-XXXXX  /netld        154 M

Transaction Summary
================================================================
Install       1 Package(s)

Total size: 154 M
Installed size: 154 M
  Is this ok [y/N]:
```

As shown above, you will be prompted `[y/N]`. Answer `y` here. Installation continues and finishes. After that, if you have ever installed netLD before, the installer may ask you if you want to overwrite the certificate. If so, answer `y`. Further description on SSL certificate is available in Sec. 5.4.1.

```
Verifying  : netld-2013.08.0-20131127.1745.x86_64
Installed:
  netld.x86_64 0:2013.08.0-20131127.1745

Complete!
A certificate has already been created for this
server. Would you like to overwrite it?

  Overwrite [y/n]: y
```

Then you will be asked to enter some information to set up an SSL certificate. Example information is shown below.

```
Net LineDancer clients use SSL to communicate with the
server.  An SSL certificate must be generated for this
machine.  The hostname field below must accurately reflect
the hostname for this server.  Only ASCII characters
are supported.

  Hostname (FQDN): logicvein.com
```

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```
  Organization Unit: lvi
  Organization: lvi
  City: kawasaki
  State or Province: Kanagawa
  Country Code [JP/KR/US]: JP
```

Finally, you will be asked for an license file. If you continue using netLD with a trial license, just hit Enter. If you already have a license file, give the full pathname to the file. After that, netLD service starts automatically.

```
Specify your internet activation serial or the location of
your license file.  If you have neither, hit enter to skip.

  Activation Serial or License File: /path/to/license.enc

Net LineDancer enabling redirection of FTP, TFTP and HTTPS
ports to host centos-virtual.
.
Starting Net LineDancer...
```

Open the browser and access `https://localhost/`. If your installation is successful and the server starts without error, it would show the **uncertified SSL warnings**, described in the next section.

When you run into trouble

If you are using the virtualization software such as VirtualBox or VMware and run netLD in the guest OS, you have to pay the special attention on how the network device on the guest OS is emulated. If you match this situation and you have trouble running netLD, below method might work for you:

- First of all, take a memo of your local IP address, for example `192.168.0.78`.
- On a browser, try accessing the IP address (`192.168.0.78`) instead of `localhost`.
- If this does not work, see the log file.
  - The log file is located in `/usr/share/netld/`, which is also the installation path.
  - Below the directory, you will see `netLD.log` (via `ls /usr/share/netld/`.)
  - Look into the log file and see the warning messages (via `less netLD.log`). If you find `java.net.UnknownHostException XXXX: XXXX: name or service unknown` or similar error messages, this is an system-dependent problem.
    - In this case, you have to resolve the name `XXXX` via `/etc/hosts` file or via DNS.
    - Let `XXXX` be `centos-virtual` for example. This is usually the hostname of your machine (available via `hostname` command on the terminal).
    - Add the following line to the `/etc/hosts`:

```
<real host IP address> centos-virtual
```

If it is not the case for you, or it does not solve the problem, or if you are still in trouble, contact support@logicvein.com with the above log file attached. Our professional support team is ready to fix things.

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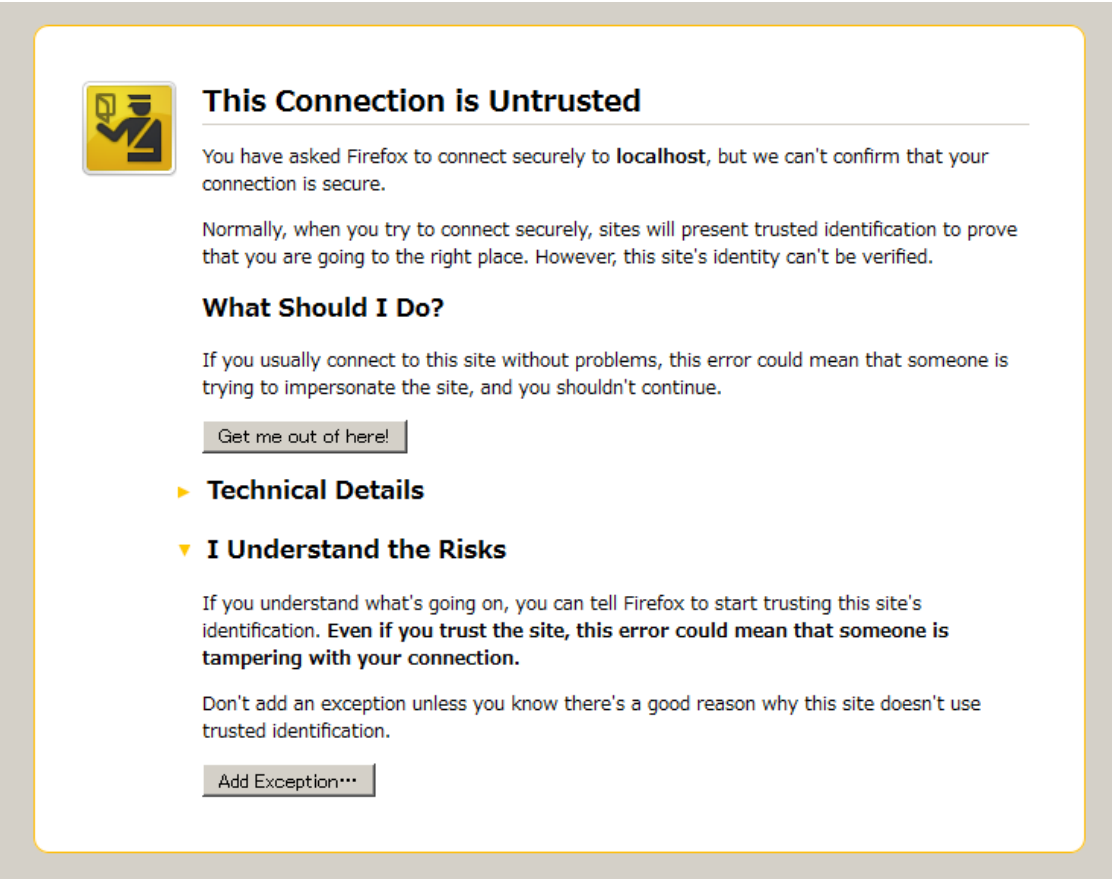
1.3 Accessing the netLD Instance

Now that the installation is complete, the netLD server is automatically running in the background and you can access its GUI. To do so, open a web browser and enter `https://localhost/` in the address bar, then hit Enter. If you are running netLD on a different machine than that you are trying to access it on, then replace `localhost` with the machine's IP address. The program is running as a standard HTTP server and the default access port is 80, but this can be modified later.

If you are running a modern browser, it complains that you are trying to access an insecure website. However clearly this website is your own local web server, you do not have to worry that it could be any malicious website.

The browser in this example is Mozilla Firefox and you should click on *Add exception*. The similar interface is provided in Microsoft Internet Explorer and Google Chrome. On IE, select "Continue to this website (not recommended)". On Chrome, select *Proceed anyway*.


This Connection is Untrusted
You have asked Firefox to connect securely to localhost, but we can't confirm that your connection is secure.
Normally, when you try to connect securely, sites will present trusted identification to prove that you are going to the right place. However, this site's identity can't be verified.
What Should I Do?
If you usually connect to this site without problems, this error could mean that someone is trying to impersonate the site, and you shouldn't continue.
Get me out of here!
Technical Details
I Understand the Risks
If you understand what's going on, you can tell Firefox to start trusting this site's identification. Even if you trust the site, this error could mean that someone is tampering with your connection.
Don't add an exception unless you know there's a good reason why this site doesn't use trusted identification.
Add Exception...

This security certificate messages can be safely ignored in this case and do not affect the behavior of the program. They are displayed just because your browser is not aware of the SSL credential used by netLD. You can safely disable this dialog by adding the SSL certification of your server to the browser. The instruction for adding the credential is given later in the manual, Sec. 5.4.1.

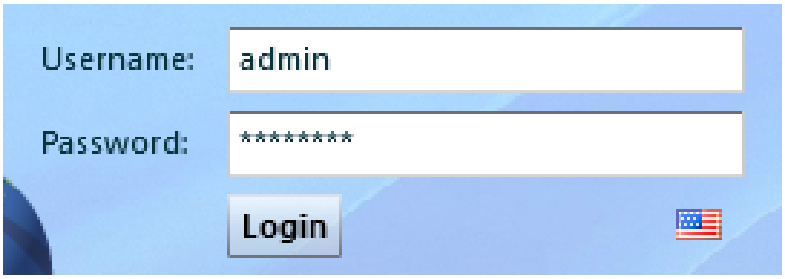
1.4 Login

Voila! Now the netLD login screen should be displayed. For security reasons, whenever you log in to netLD, you must provide a username and the password. The username and the password for the initial login are shown below.

Username: admin Password: password

Figure 1.4.1: The login screen.

Figure 1.4.2: Enter the default passwords.



†[2]

If you are using the free trial version, the evaluation license expires in 30 days after the first login. Similarly, if you have authenticated the license via a license file, it expires in 30 days after the date issued. In order to upgrade from the free version to the full version, you have to add a license file (Sec. 5.4.2).

[2]**IMPORTANT** — please change the admin password later for more security. When you cannot change the password immediately, disconnect the machine from the network at least. (However, it still allows the attackers to sneak into the system using viruses sent via devises such as USB flash drives.)

The instruction is given later in the manual, Sec. 3.2, but we also describe it briefly now: after the login, click on the "Settings" in the upper right corner of the screen, go to "Users" section, double-click on the user "admin" and then modify its password.

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1.5 Initial configuration

In order to gather the configuration data of the network devices in your network, netLD needs to know how to access those devices. In this section, we give a brief overview of how the configuration proceeds in netLD. After these configurations are done, we gain the full access to the network devices via our convenient interfaces.

1. *Adding the Devices.* First, add devices to netLD inventory. You either add devices manually or use the "automatic device discovery" facility. See Sec. 3.3.1 for details.

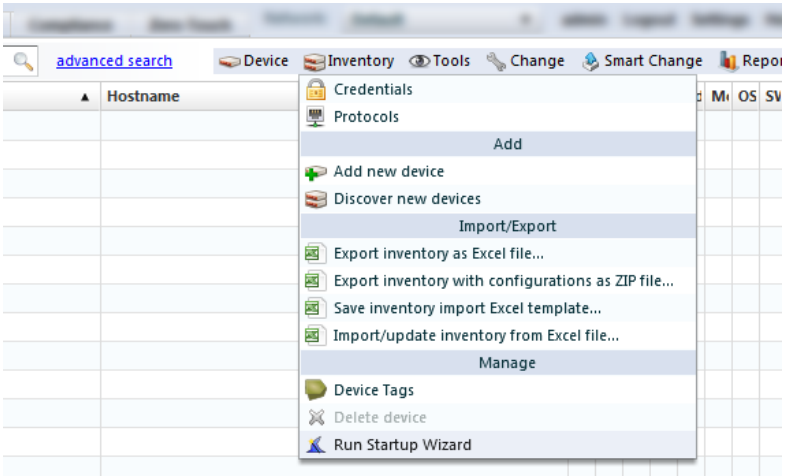
2. *Setting the Credentials.* Register a username and the associated password of each devise. This information is used every time netLD log in to the devices under control. See Sec. 3.1 for details.

3. *Performing a Backup.* netLD creates backups of the configuration data of each device in the inventory. It allows you to com-pare configurations between devices, detect changes in configurations and track down the history afterward. See Sec. 3.4 for details.

4. *Setup the Schedules.* Make the schedules of the back-ups. We recommend that you would take a backup on a regular basis. Further description is available in Sec. 3.7.

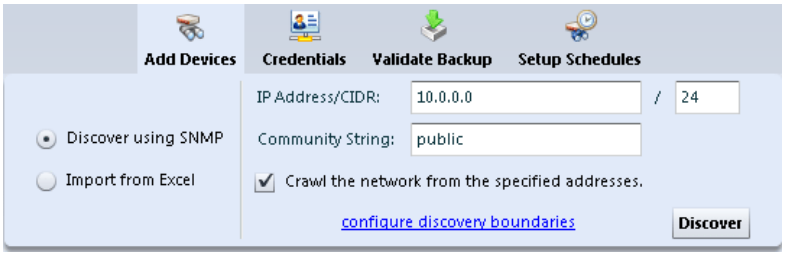
We also provide a built-in *Startup Wizard* that will show up when you logged in to netLD the first time. This wizard can be suspended at any time and also invoked later again. To access the wizard, find *Inventory* section in the upper-right menu bar and click on it to navigate to *Run Startup Wizard*.

Startup Wizard can be accessed from here.



1.5.1 Adding the Devices

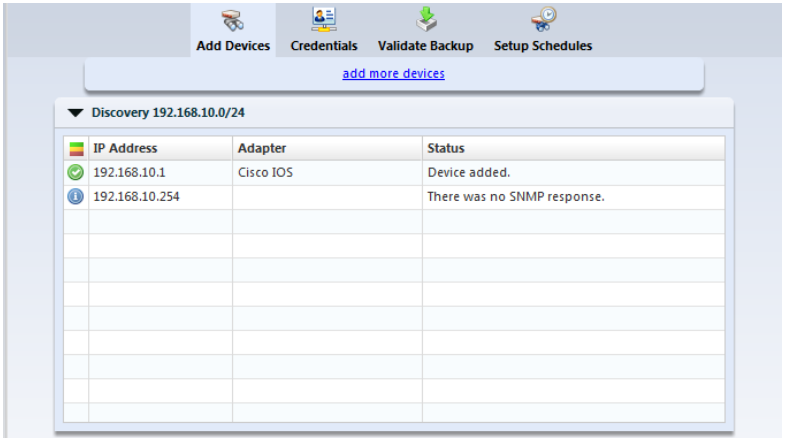
You can add devices to the *inventory* either manually or automatically, but now we describe the automatic method only. First, open up Startup Wizard. You will see 2 input areas, *IP Address/CIDR* and *Community String*. IP Address and CIDR specify the target range of the IP Addresses with a subnet mask. *Community String* is the information netLD uses in the SNMP communication during the automatic discovery. In most devices, the (read-only) community string is `public` by default.



Menu Items	Example
IP Address/CIDR	192.168.0.1/24
Community String	`public`

Once you think you have entered the correct information, try the *Discover* button. A new table shows up and tells you about the progress. The leftmost icons are supposed to show or , which indicates some information is missing. However this is expected, because we have not yet entered the credential information. Credential information is described in the next section.

Figure 1.5.1: Results after adding a device. Icons indicates the status of the device e.g. in this figure, indicates successful addition. However, users reading this tutorial usually do not see much usually, and it is an expected results!



The discovery can be run later (described in Sec. 3.3.1.) If you already have a CSV spreadsheet containing the list of device IP addresses, *Import from Excel*

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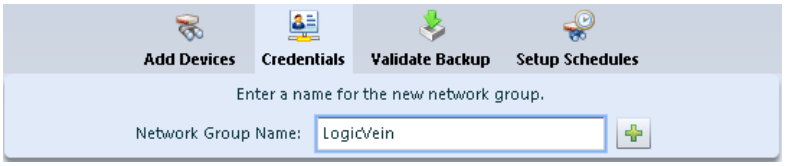
option might be useful. The specification of the spreadsheet columns is available in Sec. 3.3.6.

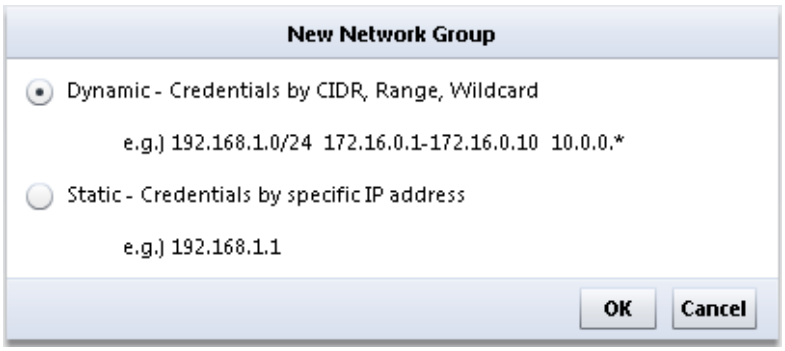
1.5.2 Setting the Credentials

After the devices are added, you have to register the login information for the devices in order to allow netLD to freely login the devices. In Startup Wizard, you can click on the large *Credentials* icon to do this. †[3]

First, enter an arbitrary name for the network group. This can be modified later. In this example, we chose "LogicVein".



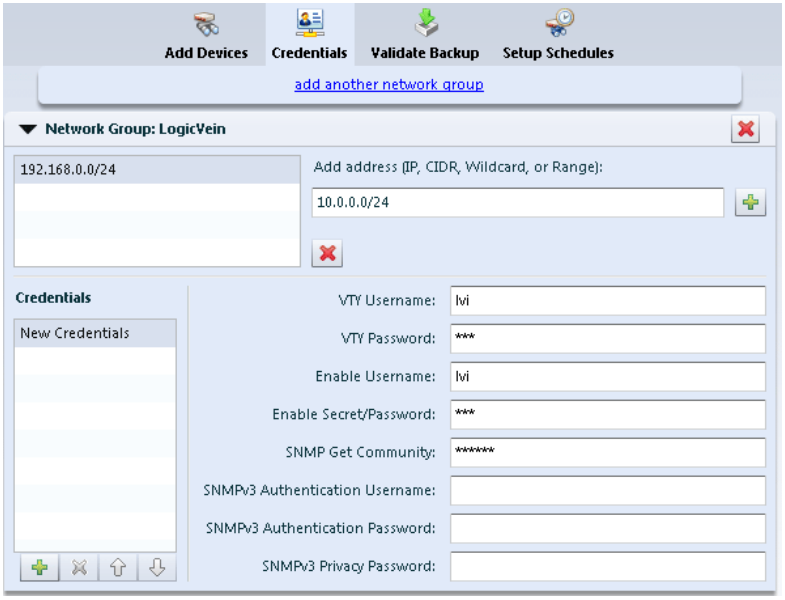
Next, choose if you specify the IP address by range (*Dynamic*) or by entering the IP address directly or from the spreadsheet (*Static*). In most cases, *Dynamic* method is better for the new users.



[3]Clicking on the above icons will change the current tab in Startup Wizard, so you can go back and forth at any time in this Startup Wizard. This allows you to, for instance, go back to *Add Devices* section and run the discovery again.

If the devices are not detected correctly, then you can repeatedly add the credential information and try the discovery. Similarly, you can add the credential information, try the backup, discover more devices, add the credential information ... (looping). These cycles iteratively improve the information accuracy and the completeness in the database. Note that, during discovery and backup, the device configurations are not modified and it is safe to run these operations again and again.

Enter the login information to each devices.



In *VTY Username* and *VTY password* area, enter the CUI login username and the password used during the SSH (or telnet) connection. If the devices have both the secret password and enable password, enter the secret password. If only the enable password is available on the device, enter the enable password.

You can add multiple *Network Groups*. Also, you can register multiple *Credentials* and *IP ranges* per each group. The concepts like *Network Groups* and *Credentials* are described in detail in the later chapter (Sec. 2.)

†[4]

[4] *Credential* feature is available outside of Startup Wizard just as *Adding devices* is. You can change the value in *Inventory* → *Credentials*. Further description is available in Sec. 3.1.

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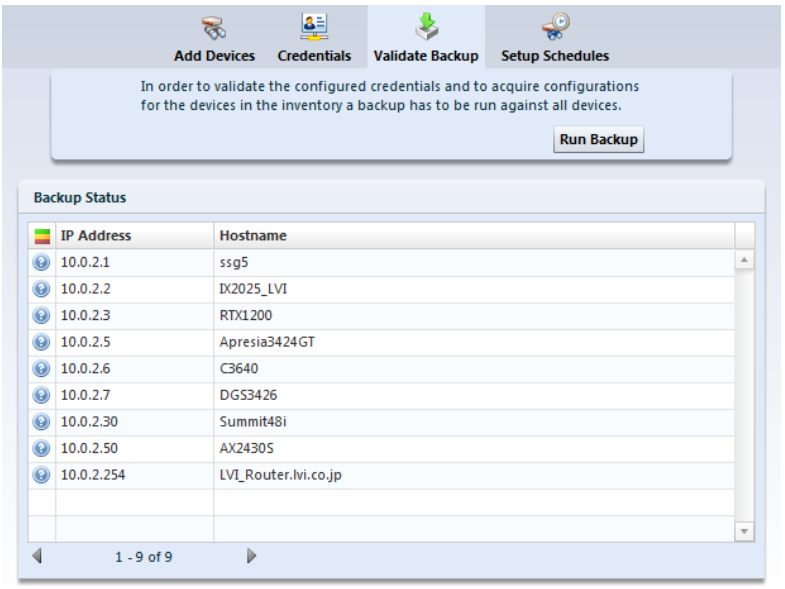
1.5.3 Performing a Backup

When enough number of devices are added to the inventory, perform the first backup by clicking on *Run Backup* button.



The backup status of each device is indicated with an icon. Successful backup shows a green icon, Credential error shows a yellow icon, Failure shows a red icon and so on. Details are described in the later section Sec. 2.2.

Usually you might fail to get the complete backup of all devices in the first time due to some wrong configurations on your network devices. However, this is a good example showing that *managing the devices is difficult and requires the considerable efforts*. Now that you have netLD, you no longer have to worry about this issue.

In order to increase the number of devices which are successfully backed up, quickly review the following conditions on each device where the backup has failed.

- Go back to the previous section and check if the registered credentials (Username, Password, Community, etc.) are consistent with the information on the devices.
- Back to the previous section and check if no network groups are using the same range of IP addresses.
- Required protocols (e.g., telnet, ssh, etc.) are already enabled on the device. In order to do this, you have to manually log in to each device via CUI and change the configurations. The required protocols are listed in Sec. 7.1.
- Certain ports for those communications are not blocked neither by any firewalls nor by any antivirus software. The list of TCP/UDP ports used by netLD is available in Sec. 7.1.
- Check if your devices are supported. The available device adapter list is in Sec. 7.7.

If the program is not able to perform a backup even though the above conditions are met, please get the log file through the following steps and send it to our support office (support@logicvein.com).

1. Take a memo on the devices whose backup fails.
2. Click on the *Close* button in the bottom-right of the Startup Wizard dialog.
3. Find the *Help* section in the menu bar located in the upper right corner of the screen.
4. Navigate through *Help* → *About* → *Adapter Logging*.
5. Enter the IP addresses of the devices in IP/CIDR field. Check on *Enable recording of adapter operations* and click on the OK button.
6. Perform a backup for those devices.

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7. The log file is exported to `C:¥Program Files¥Net LineDancer¥scratch¥logs` (on Windows Server).

8. If you are already done with SMTP server setting, you can:

   (a) Select Help menu located in the upper right corner of the screen and select About option.

   (b) Click on the Send Log and enter your e-mail address in Your E-Mail field, and click on the OK button.

   In order to setup the SMTP server, see Sec. 5.2.3. Otherwise, you can simply send an email to support@logicvein.com with the log file.

1.5.4 Scheduling the Backups

Now you got the first backup successfully! Then why not make it run the backup on the regular basis? Always keeping track of all the configurations is critical for the robustness and the security of your network.

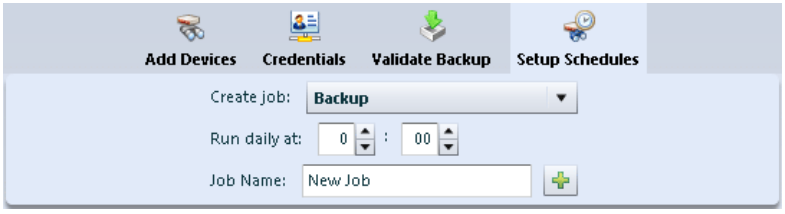

Figure 1.5.2: Scheduling a backup.

Creating a periodical schedule of backup jobs is quite easy. Just go to the next tab and create a *Backup* job. In *Run daily at*, you can specify which time of the day you want to perform the backup. In netLD, the scheduled tasks are called *jobs*. The options available in Startup Wizard are quite limited compared to what can be done in *Jobs* tab. The full feature of job scheduling is described in Sec. 3.7.

You can also specify a *neighbor jobs*, in which netLD acquire the neighbor information from each of the network devices. Same as the backup jobs, only the daily schedules can be created in this Startup Wizard. However, in-depth configuration can be made afterward.

If you need further assistance or technical support about Net LineDancer, please fell free to contact below. We will be pleased to help you when you find any errors or ambiguities in this manual, or any questions regarding them as well. Please note that we are closed on weekends, national holidays, New Year and summer holidays in Japanese time. We accept e-mails for 24 hours but we will only reply on those business hours. Thank you for your cooperation.

LogicVein, Inc. Technical Support

Mail: support@logicvein.com

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Chapter 2

netLD Basics

In this chapter, we define the several basic concepts and names that are used among this manual, from just the terms of UI elements to the concepts that generalizes the differences between the devices. Descriptions in this manual depend on the definitions in this section, but since most of them follow the usual conventions, knowledgeable users can safely ignore this section, partly or completely.

2.1 Basic controls and UI elements

In this section, we define the names of the various UI elements in brief.

2.1.1 Panes

Panes are the divided parts of the entire area of the browser. Horizontal and vertical division is possible, and the things in both sides are called so. Fig. 2.1.1 shows an example of the common netLD web-based GUI.

The most frequently used panes are the *main pane* and the *status pane*. One of those panes can be hidden via the small triangle buttons in the middle. Both panes have multiple *tabs*.

Please keep in mind that they are independent. Therefore, you can keep showing the lower status pane as it is, while you switch the main pane to another tab. This helps the multitasking, e.g., adding the elements in the upper pane into the list in the lower pane, while you are configuring a feature in the other tab in the upper pane. This technique is called *Tab Switching Technique* and described in *Creating a New Job* section (Sec. 3.7.1).

2.1.2 Menu and Submenu

Fig. 2.1.1 also shows the *global menu* and the *tools menu*. Tools menu is a menu in the Devices Tab, highlighted in light blue. The global menu is highlighted in brown as well. You can access the Server Settings Window (or just *settings* window) and so on.

Fig. 2.1.2 shows how a menu is composed. If you click on the each item of the menu then a *submenu* will pop up. *submeny* may contain several *sections* which works as separators. Finally, there are several items between sections separators.

In this manual, we indicate a menu item A in submenu B by $B \rightarrow A$. We use the similar notation if the element is located in *section* C e.g. $B \rightarrow C \rightarrow A$.

2.1.3 Subtabs and Subpane

In the previous figure Fig. 2.1.1, you would notice that the lower pane is again divided vertically. In Fig. 2.1.3, this is called *Subpanes*. Also, one of the subpane in the right has its own tabs, and we refer to it as just "tabs" or sometimes "subtabs" when we have to clarify.

2.1.4 Window

Windows are the UI elements that individually pops up in the browser. Small windows are also called *dialogs*. The most common windows appear in this manual is the *Server Settings* window, shown in Fig. 2.1.4. It is often called as just *settings* window.

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Figure 2.1.1: A screen capture of netLD Main UI.

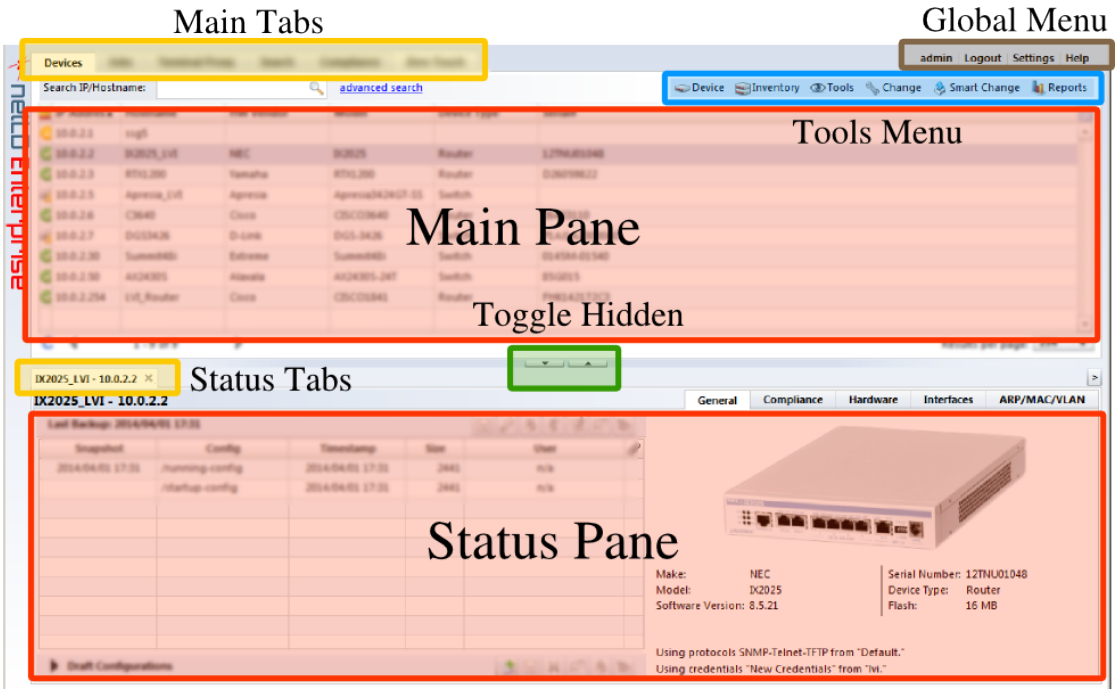


Figure 2.1.2: Menu items.

Figure 2.1.3: Subtabs and Subpanes

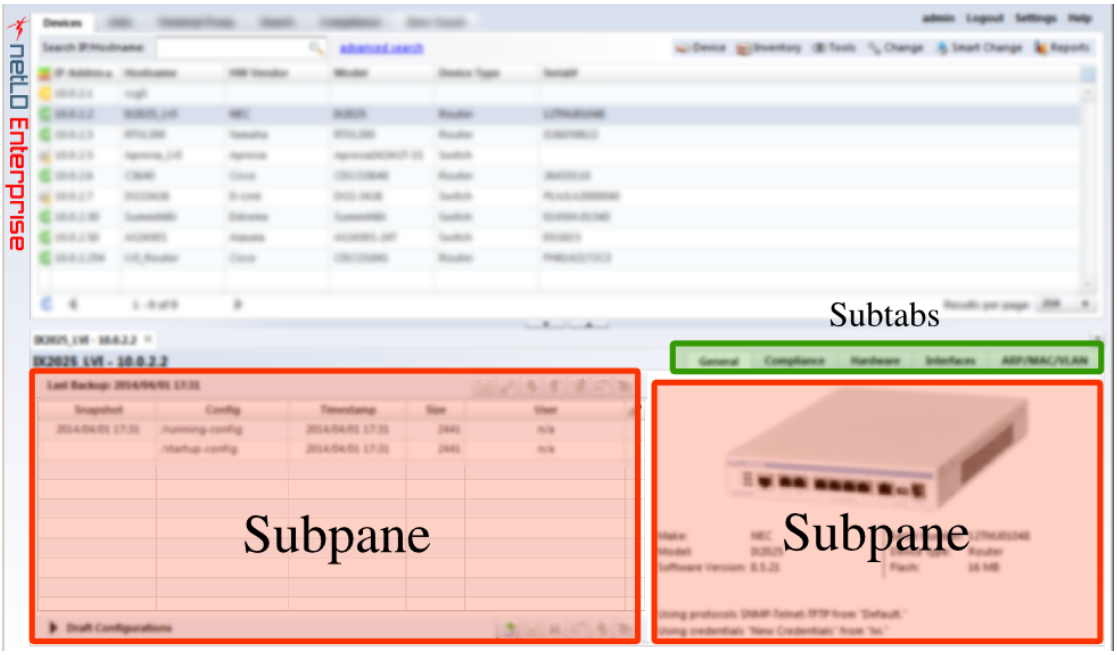
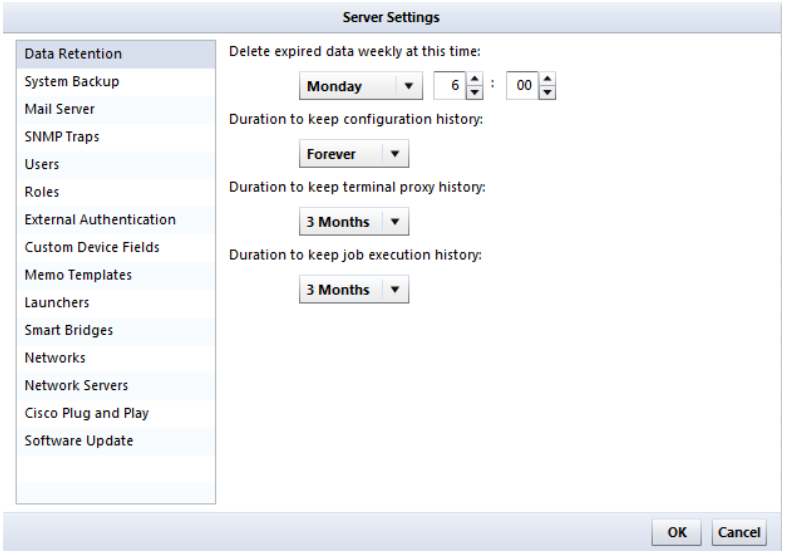


Figure 2.1.4: Server Settings window. It has various menus on the left side and the settings can be modified on the right. The changes made in this window is immediately applied when you click on the "OK" button to close the window. If you click on the "cancel" button, then it discards the changes and closes the window.



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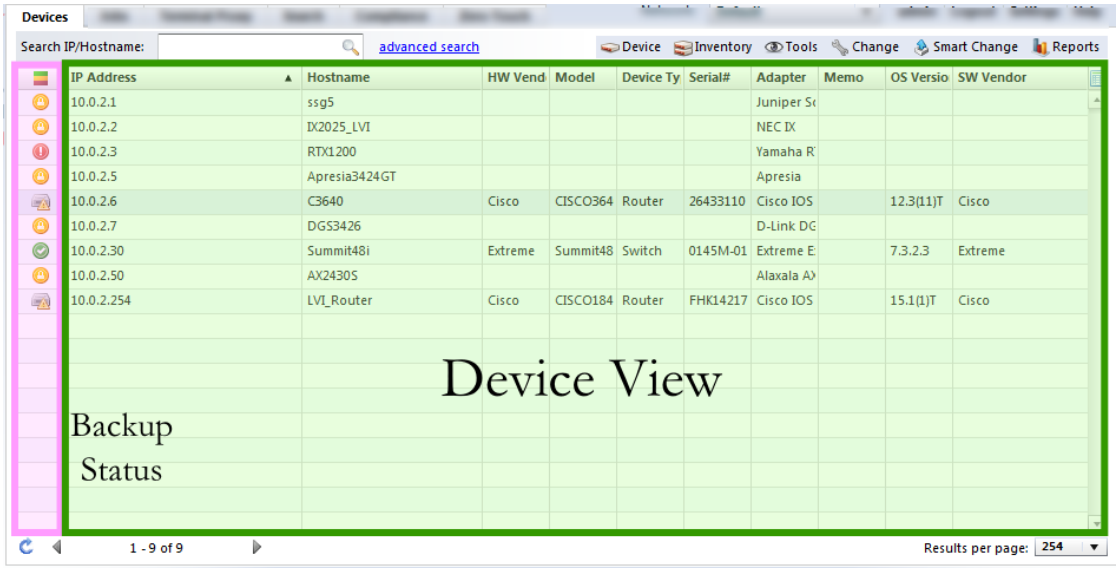
2.2 Devices, Configurations and Backups

Next, we describe the interfaces for configuring the devices. Fig. 2.2.1 shows the *Devices Tab*, the primary tab for handling and watching the devices. If you double-click on the rows, then the status pane shows the Device Property (Sec. 3.4.4) and the backup history.

Figure 2.2.1: Device View.



Backup Status The status icons changes upon the device backup or when a compliance error is signaled. It is highlighted in pink in the figure.

Device View All devices in the inventory are listed here. As stated above, you can check the configurations stored/backed up in the server by double-clicking on each device. It is highlighted in green.

Intuitively, each element in the Device View corresponds to one network device such as CISCO switches and routers. The amount of information in the table varies among the device vendor. For example, netLD does not show the serial number for Apresia devices.

On *Device View*, you can click on the device to *select* it. Just as in the common file manager software, you can select multiple devices by pressing Shift key or Control key while clicking on the device. When you press Shift, the range of rows are added into the selection. When you use the Control key the clicked row is added into the selection. This is useful when you apply a single operation on many devices, and most table-like views in netLD provide the same feature.

If you have already through the tutorial and successfully run the backup, the *Backup Status* should contain some icons .There are many other icons and the details are described in the later section (Sec. 3.4).

Successful backup
Credential error
Backup Failure

Devices can be added, modified, deleted, backed-up, tagged and searched for. Each feature can be accessed from the following menu. The details are described in Sec. 3.3.

Adding the devices Inventory → Add.

Editing the properties of the selected devices Device → Edit device properties. You can manually modify the IP address, hostname and the device type and vendors.

Delete the selected devices Inventory → Manage → Delete device.

Back up Device → Backup.

Search the inventory for devices via the Search bar. It provides a useful incremental-search interface.

Manipulate Tags on the selected devices Device → Associate/Dissociate tags, Inventory → Manage → Device Tags. The Tag information can be used during the search.

2.2.1 Adapters

An *Adapter* basically means the model and the OS of the device. netLD has a module for each adapter type and use it to manipulate the device which belongs to that adapter. For example, many *Cisco IOS* based devices (like CISCO2500) have *Cisco IOS* adapter. Generally speaking, the devices of the same adapter can be manipulated in the same command sequence.

netLD has several adapters and we are developing even more adapters for the broader range of support. The complete adapter list can be found in Sec. 7.7.

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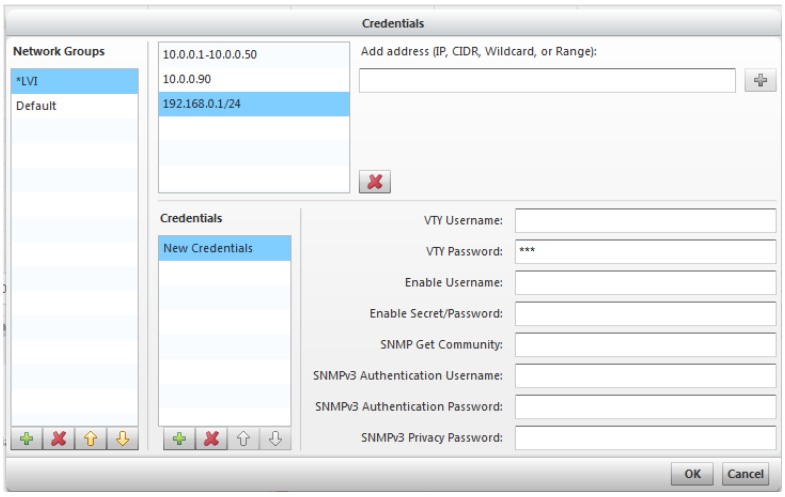
2.3 Credentials, Network Groups, Protocols

A *Credential* is the login/security information of each device. You have to give the information to netLD in order to let it access the device. Information can be added in *Credentials* window, accessible via *Inventory* → *Credentials*.

Figure 2.3.1: Credentials window.



In Credentials window, you should enter all the information needed to access the devices (username, password, SNMP community and etc.). You can leave them blank if certain information is not required, but if there is any lack of credential information, it leads to login failure and every operations fail, e.g. reading and writing information, backup or compare would not be successful.

Each Credential contains the following information:

Entry	Description
VTY Username/password	The username/password required by the login shell on each network device. The login shell can be one of ssh and rlogin remote terminal. Note that VTY stands for *virtual tty console*.
Enable Username	Administrative Username that is required when you modify the configuration.
Enable Secret/Password	One of the two kinds of passwords for the CISCO devices (former the better)
	These correspond to each field in the SNMP datagram.
SNMP Get Community	The name of Get Community in SNMP.
SNMPv3 Authentication Username	The name of Authorization Community defined in SNMPv3.
SNMPv3 Authentication Password	The community's login password defined in SNMPv3.
SNMPv3 Privacy Password	The password used for the encryption during the connection.

2.3.1 Network Group

A set of credentials forms a *Network Group*. A network group can be defined by the list of *IP Address Ranges*, and each network group contains many credentials. When netLD tries to log in to a device, it looks up the network group that the IP address of the device matches. If more than one credentials are available in a network group, netLD tries each credential in the list in turn and use the first valid credential.

Note that the IP ranges should be pairwise disjoint among network groups, or the incorrect credential might be applied to the devices. It leads to the backup failure.

In the initial configuration, there is only network group *Default*.

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2.3.2 Protocols

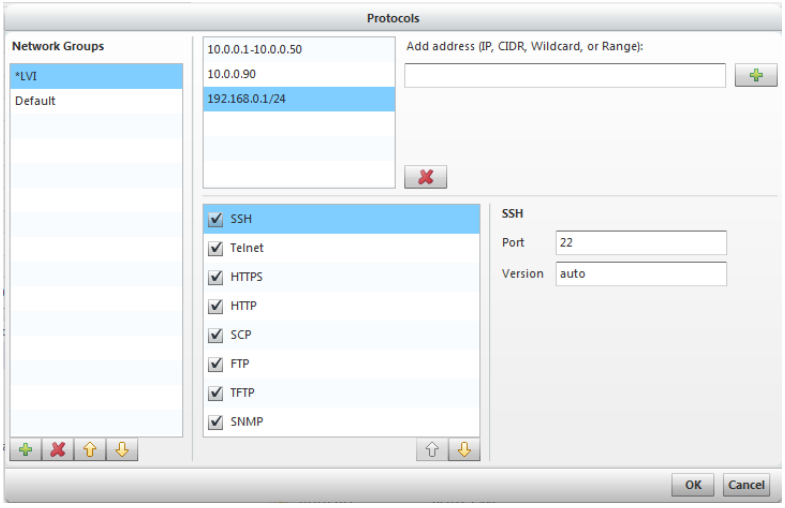
Protocols specify the measure to connect the devices. Just as credentials, protocols used by netLD can be customized in *Inventory* → *Protocols*.

For each protocol, you can define several network groups defined by an IP range, just like in Credentials. It might be misleading, but network groups for credentials and for protocols are not associated by its name. They are named independently and no relevance is detected.

In each network groups, you can specify the list of protocols that is used for the given IP range. The list is tried upon connection from top to bottom. In Credentials window we specified the login information, while in protocols window, instead, we specify the connection protocols information.

Initially only the *Default* network group exists, and it is used by default. The input interface is almost the same as that of Credentials window.

Figure 2.3.2: Protocols window.



In each input field,

- Enable the checkbox if the protocol could be used during the backup and other operations. In the Default network group, all protocols are checked by default.
- Up/down arrow buttons move the order in the list and change the priority of the protocol. netLD tries to use the protocol of the top priority. If it fails, then it tries to connect with the protocol of the next priority.
- To add a new protocol specification, click on the and enter a name of the group.
- Enter the IP address ranges in Add address (IP, CIDR, Wildcard, or Range) field. Click on the to add it to the list on the left.

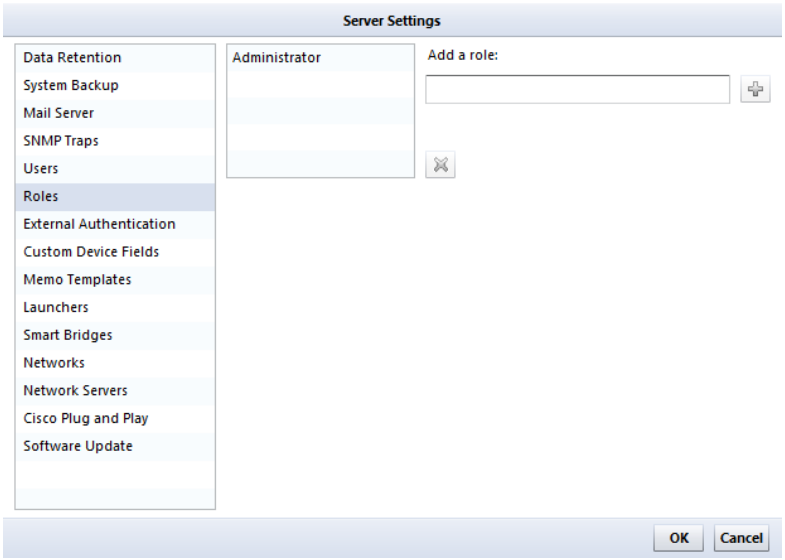
2.4 Users and Roles

Roles manage the user permissions in general. Each role defines a set of permissions such as read/write permissions on devices. Each user belongs to exactly one such role, and the role effectively controls the user's access to those networks and operations. The complete list of configurable permissions can be found in Sec. 7.3, p.232.

User	experience	Role(s)
	0 yr	backup only
	2 yrs	backup & schedule in Network A
	5 yrs	backup,schedule,modify in Networks A,B
	15 yrs	all features

Configuration on the users and the roles can be done primarily on the settings window.

Figure 2.4.1: Roles section in Settings window.



In the factory configuration, only the Administrator role is available and there is only one user named "admin", with the password set to "password". For the better security, users are highly recommended to change this password. Also, when multiple operators manage the devices, adding some roles and setting a correct permission is preferable.

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2.5 Networks

Network in netLD is a way to partition and manage the large inventory. Each Network has its own inventory, credentials and protocols. Users can create networks and switch between networks as long as they have the permission to access these networks. This is different from *Network Groups* – they have no relevance at all.

Rather, Networks are often closely tied to the *Smart Bridge* (SB) feature. Using SB, remote local networks with independent IP space can also be represented as a network. For example, it can manage the remote LANs in a different floors and buildings in just the same way as managing the normal inventory.

You can assign the access permission to each user, i.e. you can control which sets of network devices they can read and write. This is available in the *Users* section in the Settings window. Details about Networks and Smart Bridge is described in Sec. 4.3.

2.6 Service Management

netLD consists of two parts: the server program running in the background and the web-based GUI. In order to access the GUI, you first have to launch the server program.

netLD service starts automatically just after the installation. Also, it is launched every time after the system boot. You can start or stop the service manually either by clicking on the netLD icon in Windows' Task Bar or via Service Manager.

netLD service must be restarted in the following cases;

- When IP address of the netLD server was changed manually,
- When new device adapters was added manually,
- When backed up files was restored manually,
- When license file was renewed manually,
- When its program was upgraded.

On Linux systems, NetLD daemon (Linux counterpart of windows' service) can be started/stopped via `service start netld` and `service stop netld`. For details, see the man page of `service` by entering `man service` on console.

Figure 2.4.2: Users section in Settings window.

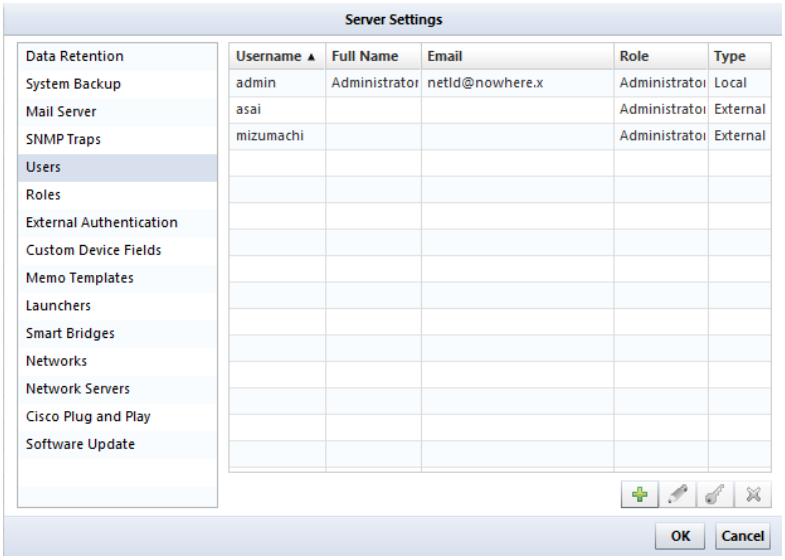

Figure 2.5.1: Network section in settings window.

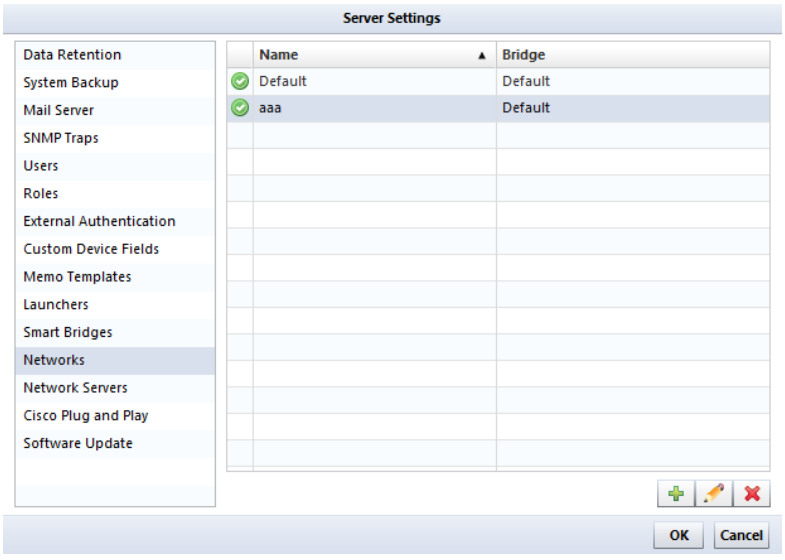

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Figure 2.6.1: Background Service and GUI concept.

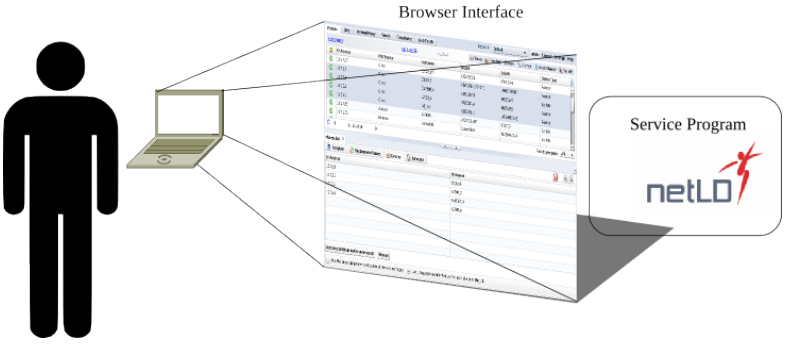
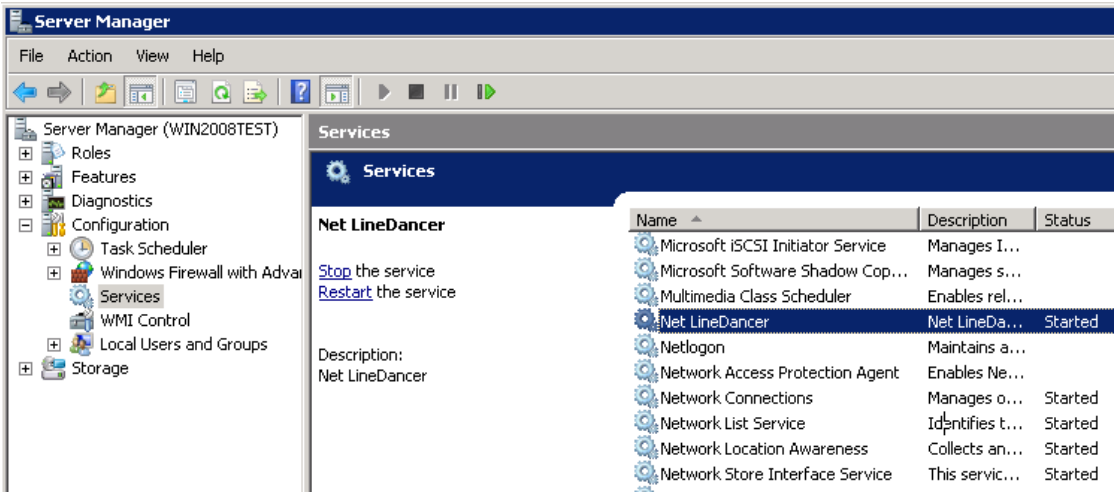


Figure 2.6.2: This is the Task Bar Icon of netLD.

Figure 2.6.3: Right-click on the icon and the menu appears, then start/stop the service.

Figure 2.6.4: netLD service can also be managed in Windows Service Manager. Select *Services* option from *Configuration* menu, and select Net LineDancer from *Name* list. After the action list (Stop the service, Restart the service) is displayed for the selected service, select the action to perform.



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Chapter 3

Basic Tools

In this chapter, we mainly provide a screen-by-screen instructions per purpose. For important and large features, we also provide the instructions to the concepts of those tools.

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3.1 Credentials

In this section, we show the process of adding credentials manually, or using data in a spreadsheet and so on. Let's start with the brief overview on how we should set up credentials and network groups.

If the number of credential information is limited, then a single Network Group might be enough for you. In this case, the same credential set is applied to all devices in the inventory. Just enter the required information to access the devices in the Credentials window.

However, in some cases, the number of credentials gets quite large and it might be practically impossible to manage them. In this case, you might have to divide the credentials into several network groups.

Starting from the version 11.04, netLD provides two ways to add credential sets, called the Dynamic setting strategy and the Static setting strategy. In Dynamic setting strategy, you assign a range of IPs and a set of credentials of each network group. In Static setting strategy, you specify the credentials for the devices one by one. Registering credential information can be done by hand or by reading a Microsoft Excel spreadsheet. We also generate an empty *static credentials Excel template* for convenience.

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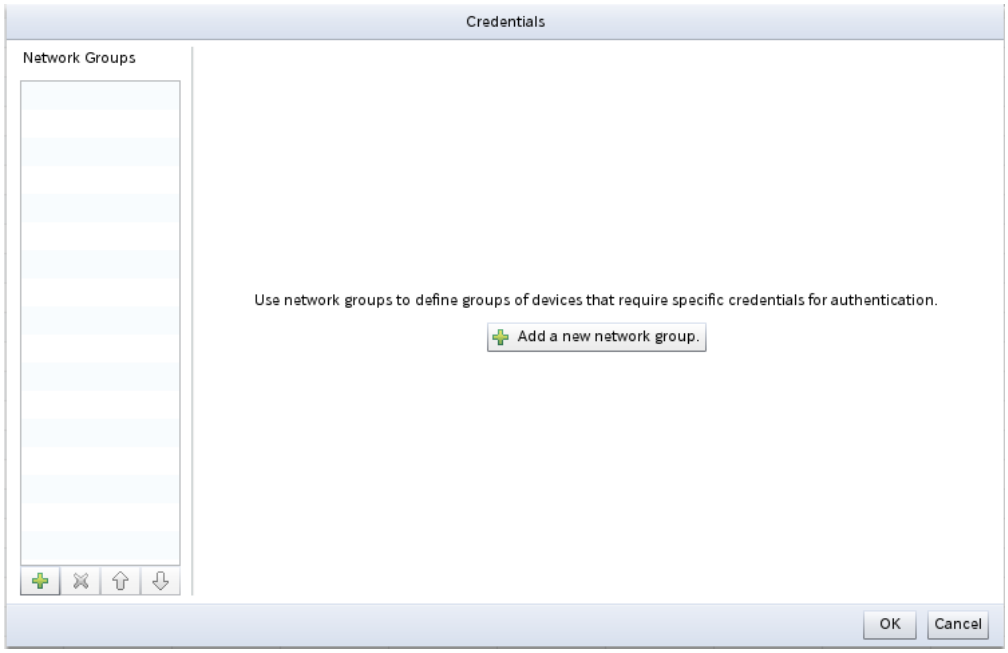
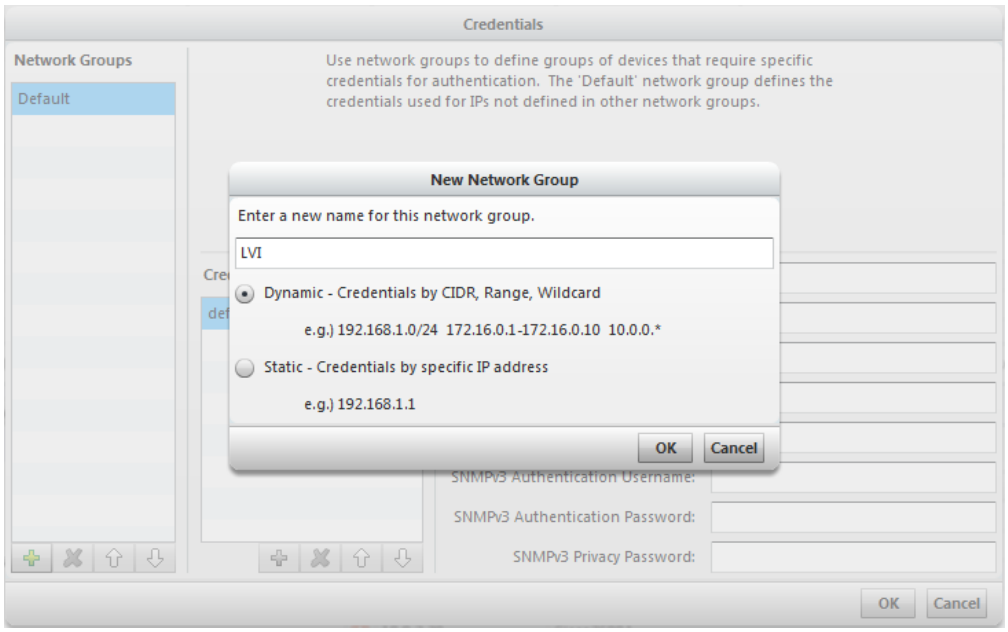
3.1.1 Dynamic Setting Strategy

Here we show how to set up a network group in Dynamic setting strategy. First open *Tools Menu* → *Inventory* → *Credentials*.

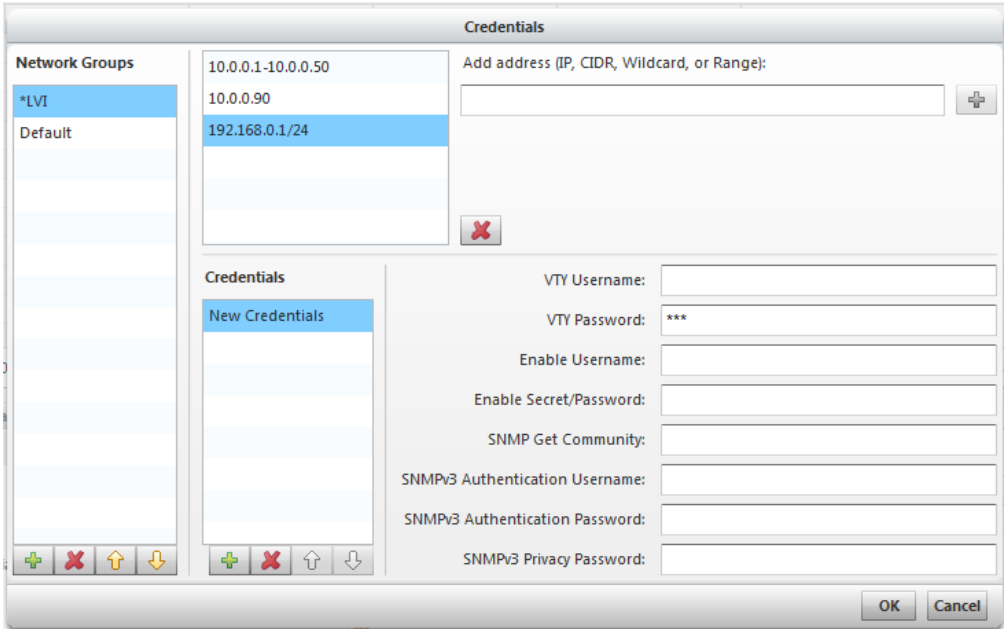
Click on the in the lower left, or click on the button in the center. This empty screen is shown only at the first visit.


Credentials
Network Groups
Use network groups to define groups of devices that require specific credentials for authentication.
Add a new network group.
OK
Cancel

Enter a new name of the network group. Select *Dynamic - Credentials by CIDR, Range, Wildcard* and click on the OK button to create a network group.


Credentials
Network Groups
Default
Use network groups to define groups of devices that require specific credentials for authentication. The 'Default' network group defines the credentials used for IPs not defined in other network groups.
New Network Group
Enter a new name for this network group.
LVI
Dynamic - Credentials by CIDR, Range, Wildcard
e.g.) 192.168.1.0/24 172.16.0.1-172.16.0.10 10.0.0.*
Static - Credentials by specific IP address
e.g.) 192.168.1.1
OK
Cancel
SNMPv3 Authentication Username:
SNMPv3 Authentication Password:
SNMPv3 Privacy Password:
OK
Cancel

Enter the range of IP addresses specifying the devices in *Add address IP, CIDR, Wildcard, or Range* field. Click on the on the right. The address will be added into the table on the left.



	Example
Single IP Address	10.0.0.1
	2001:0DB8:AC10::
Range of IP Addresses	192.168.0.*
	10.0.0.1-10.0.0.100
	192.168.0.1/24
	2001:0DB8:AC10::/64

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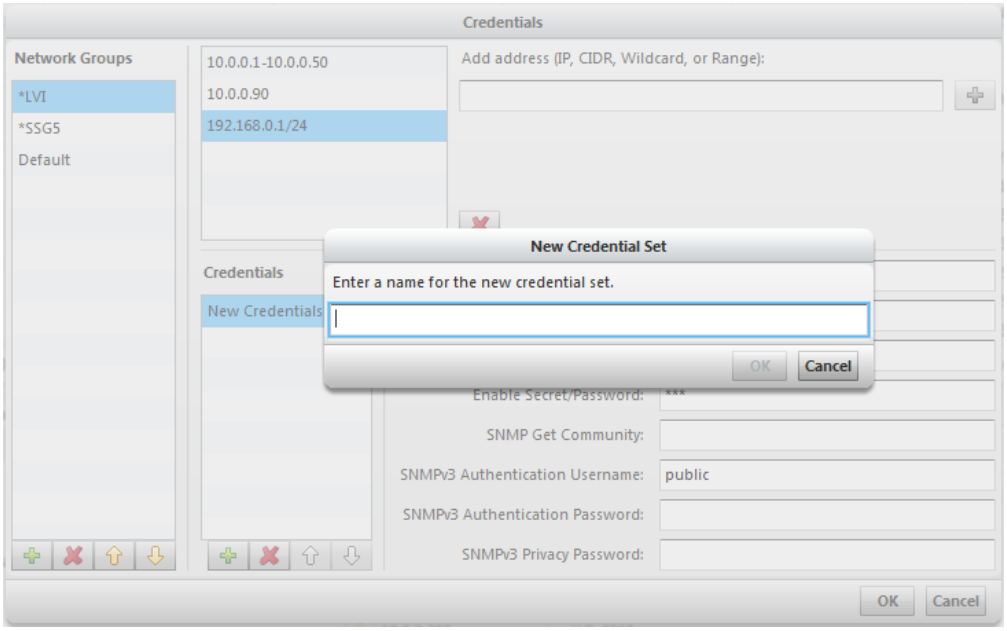
After you entered a proper IP range, register the credential information. You can set upto three credentials for one network group. Click on the just under the *Credentials* field and enter a name of the new credential set.



†[1]

Repeat these steps until all groups and credentials are added to the list. Click on the OK button to finish. †[2]

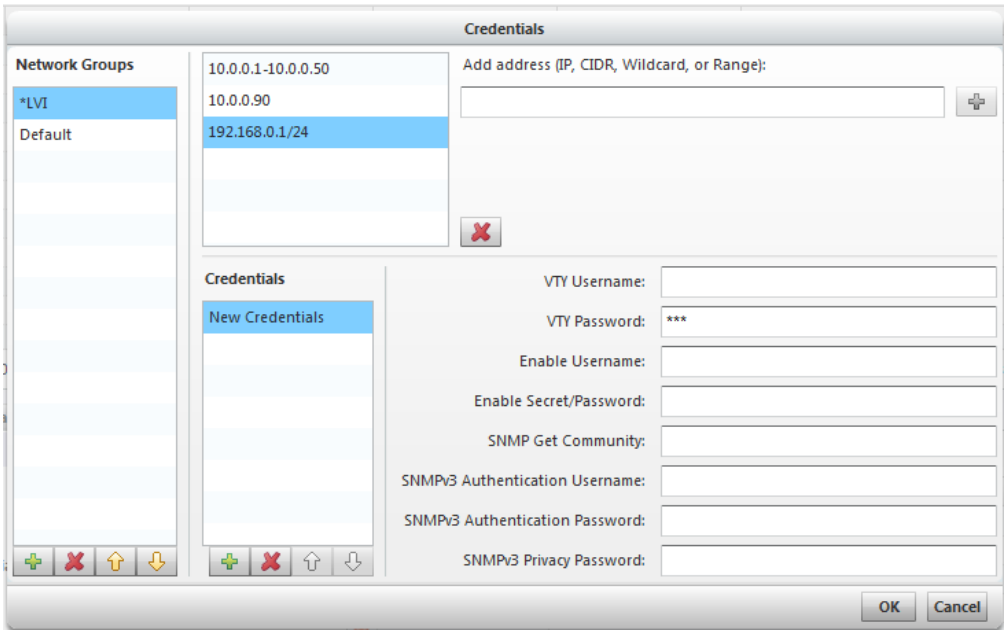
[1]If more than two credential sets are available for a group, netLD tries each set on the list in turn and uses the first valid credential.

[2]Make sure that any groups do not share the same range of IP addresses. Otherwise, netLD might fail to save the backup of the devices.

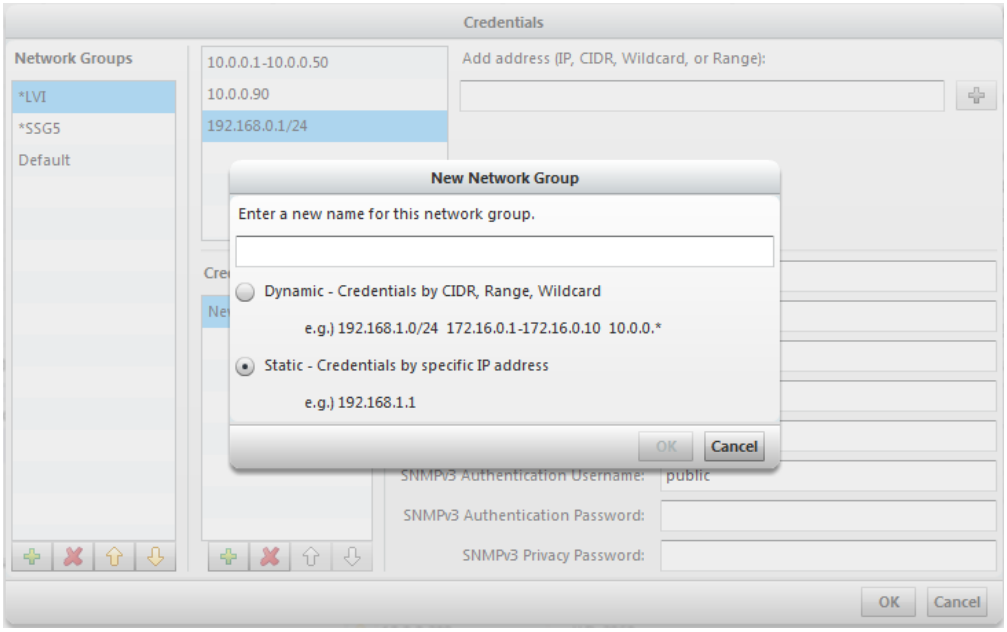
3.1.2 Static Setting Strategy

Next, we show how to use Static setting strategy.

In the Static setting strategy, you should run the process by hand. Click on the in the lower left.



Enter a new name of the network group. Select Static - Credentials by specific IP address. Click on the OK button to specify the credential set for the group.



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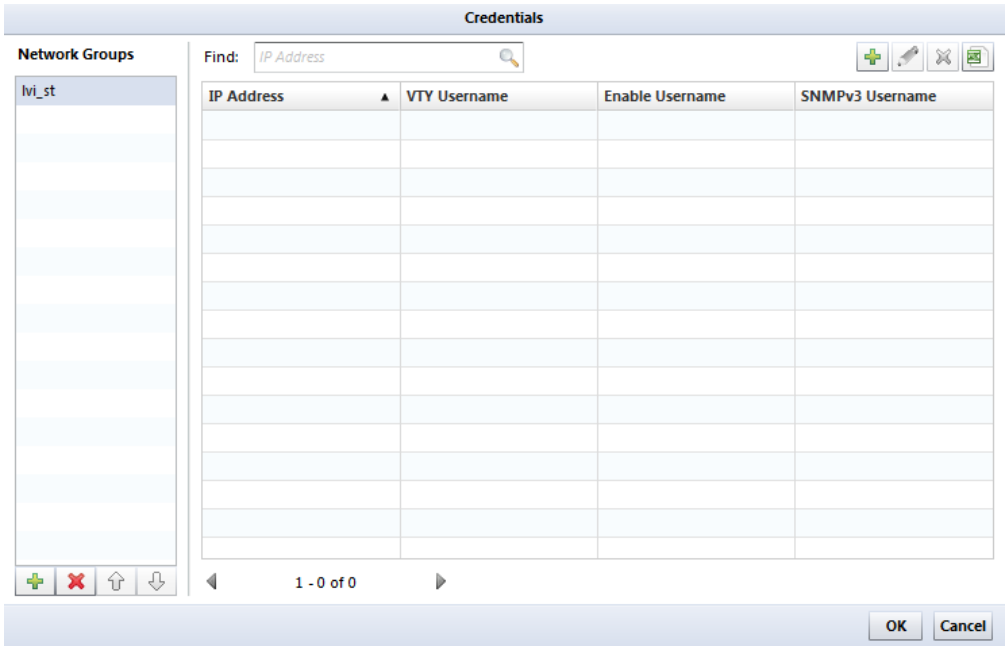
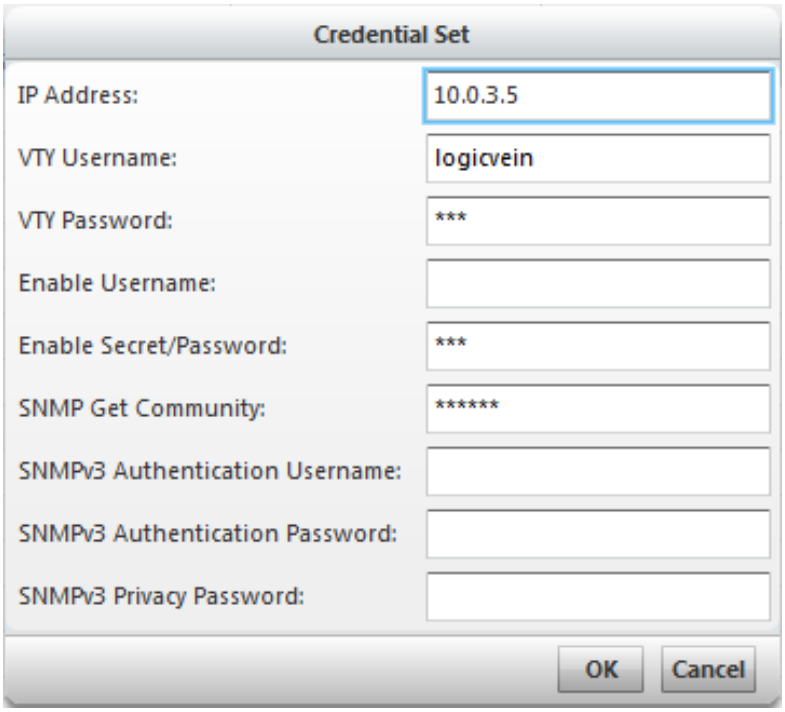
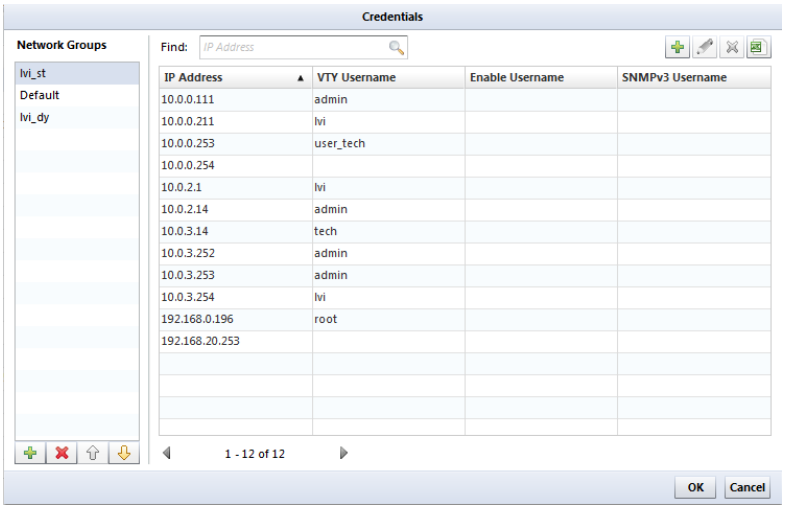
Click on the in the upper right corner of the screen to add a device credential.



Enter the required credential information of the device and click on the OK button.



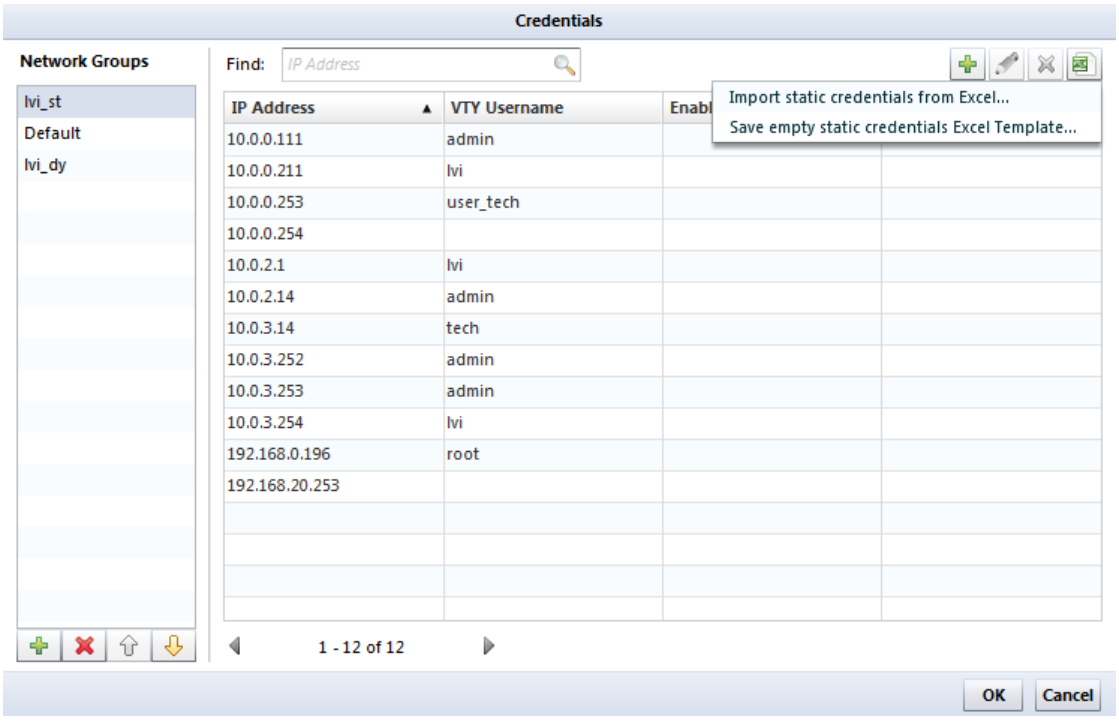
Repeat these steps until all groups and credentials are added to the list. Click on the OK button to finish.



3.1.3 Import from an Excel spreadsheet

In the Static strategy, you can also import the credentials from a spreadsheet, instead of setting them manually. During the Static setting strategy described in the previous section, follow the instruction below:

Click on the and then select *Save empty static credentials Excel Template*.



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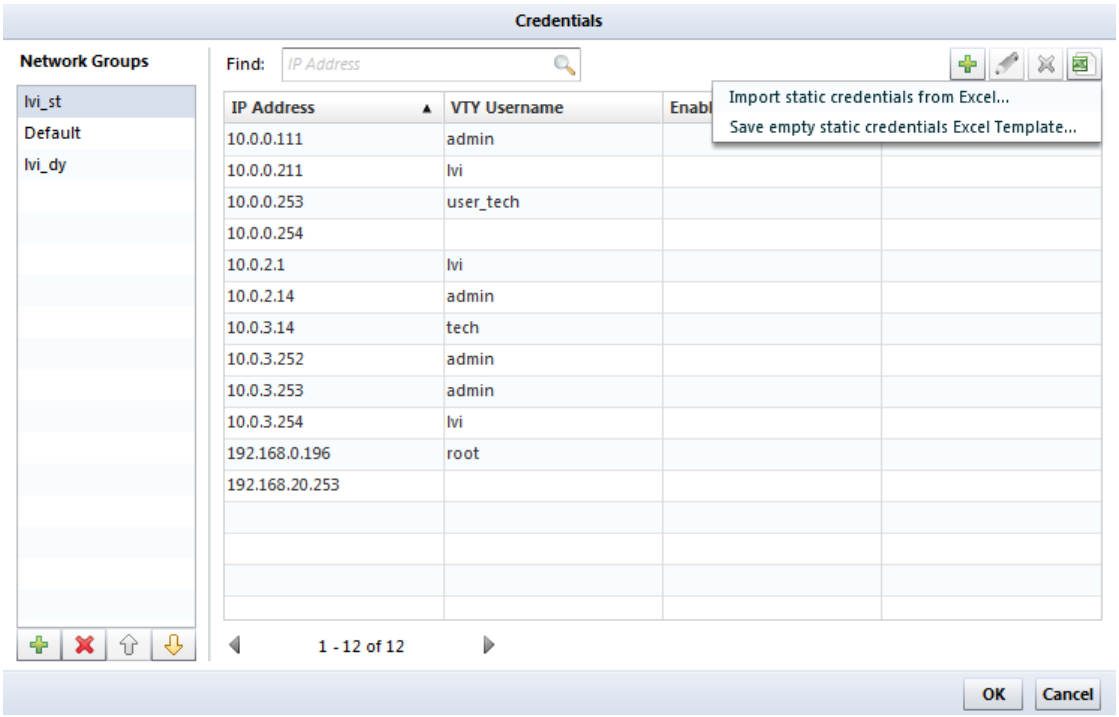
Open the exported spreadsheet and enter the device IPs and the corresponding credential information accordingly. Once you have finished, save and close the file and get back to the netLD screen.

	A	B	C	D	E	F	
1	IP Address	VTY Username	VTY Password	Enable Username	Enable Secret/Password	SNMP Get Community	SNM
2	10.0.0.1	lvi	lvi123	enable	enable123	public	
3	10.0.0.2	lvi	lvi124	enable	enalbe124	public	
4	10.0.0.3	lvi	lvi125	enable	enable125	public	
5	10.0.0.4	lvi	lvi126	enable	enable126	public	
6	10.0.0.5	lvi	lvi127	enable	enalbe127	public	
7	10.0.0.6	lvi	lvi128	enable	enable128	public	
8	10.0.0.7	lvi	lvi129	enable	enable129	public	
9	10.0.0.8	lvi	lvi130	enable	enalbe130	public	
10	10.0.0.9	lvi	lvi131	enable	enable131	public	
11	10.0.0.10	lvi	lvi132	enable	enable132	public	
12							
13							

Click on the and select *Import static credentials from Excel...* to import the data from the spreadsheet you edited above. In the file selection dialog, choose the edited one and click on the OK button.



Importing data from the external resources may overwrite the existing credential with the same IP. Ensure there is no unacceptable conflict in IP address between the existing data and the newly imported ones.

3.2 Users and Roles

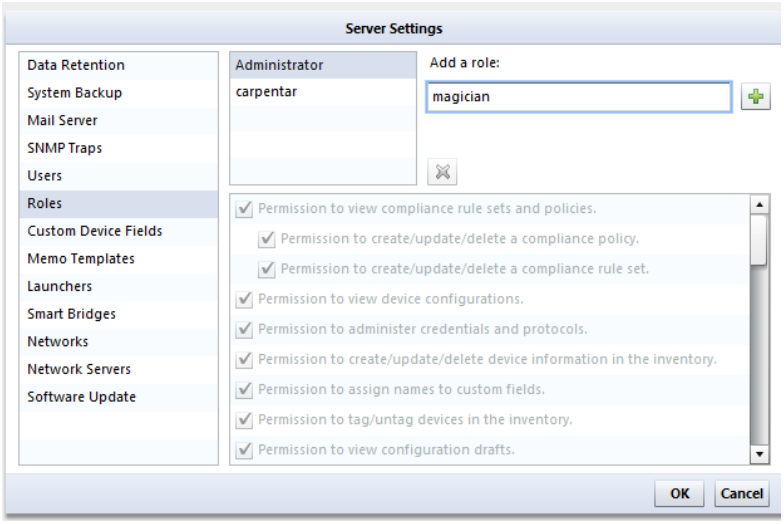
Description on Users and Roles is described in Sec. 2.4, p.34. Briefly speaking, each *Role* defines a set of available operations and a *User* has exactly one such role. The list of operations to be restricted, such as *reading* and *writing* the configuration (and more), are shown in Sec. 7.3.

In this section, we rather focus on the screen-by-screen instructions.

3.2.1 Creating a Role

Creating a Role is quite simple.

First, go to *Setting window* → *Roles*. Enter the name of the Role into the text area and click on .



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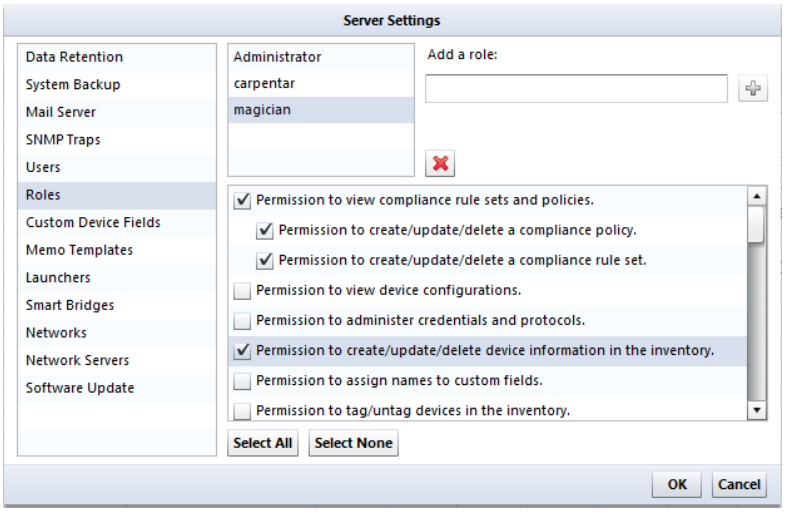
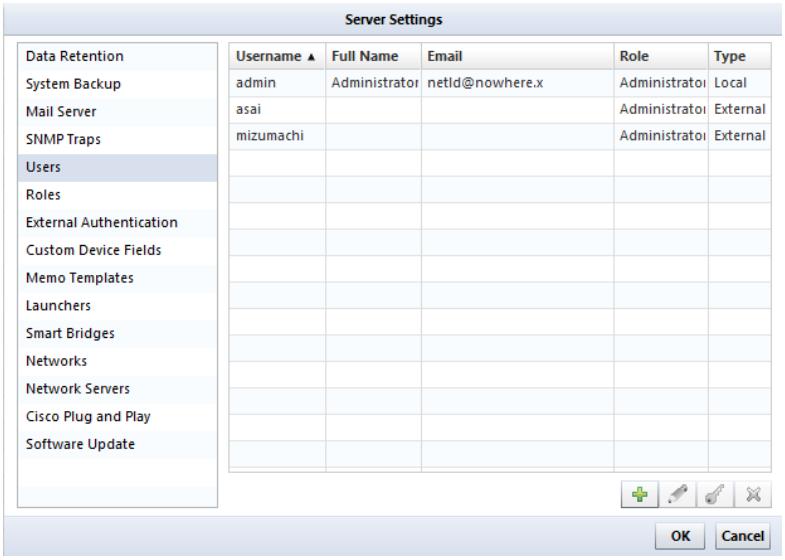
Select the permission of the role by toggling the checkbox. If the toggle is *on*, the permission to run the operation is granted to the user. Meaning of each checkbox is available at Sec. 7.3, p.232.



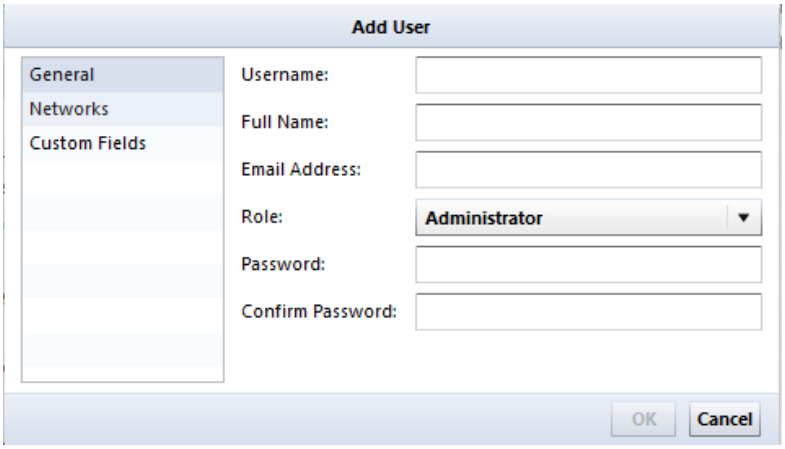
3.2.2 Creating a User

Creating a Role is also simple.

Go to *Setting window* → *Users* Again. Click on the below.

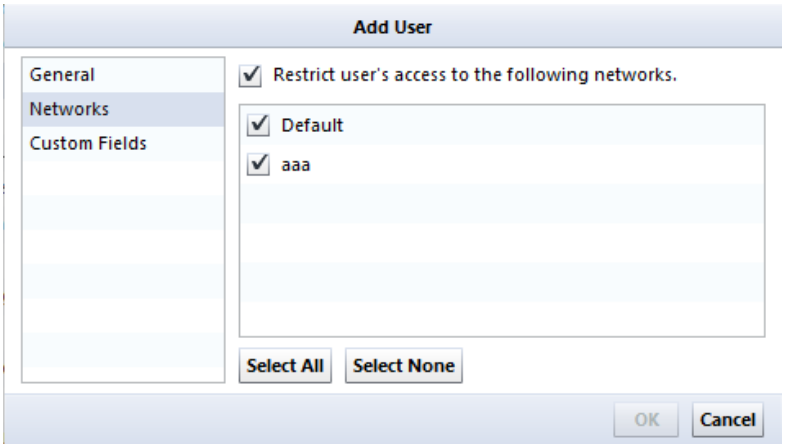


There are various fields to be customized.



Menu Items	Description
Username	Enter the login username for the user.
Full Name	Enter the full name of the user.
Email Address	Enter the user's E-mail address.
Role	Select a role for the user from the dropdown list.
Password	Enter a login password of the user.
Confirm Password	Retype the password to confirm.

In *Networks* submenu, you can restrict the user's network access. Toggle the available networks for the user in this section. The user gains the permission to access the networks whose checkboxes are *on*.



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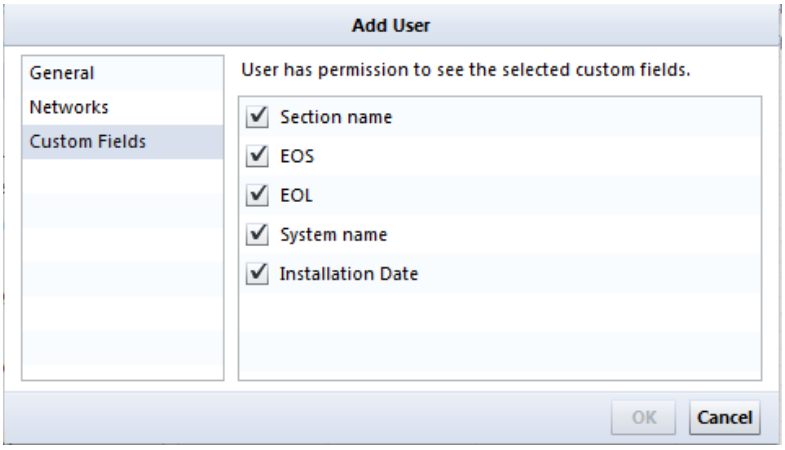
Similarly, when you restrict the user's access to the custom fields, select *Custom Fields* and toggle the available custom fields. The user gain the permission to see the selected custom fields.

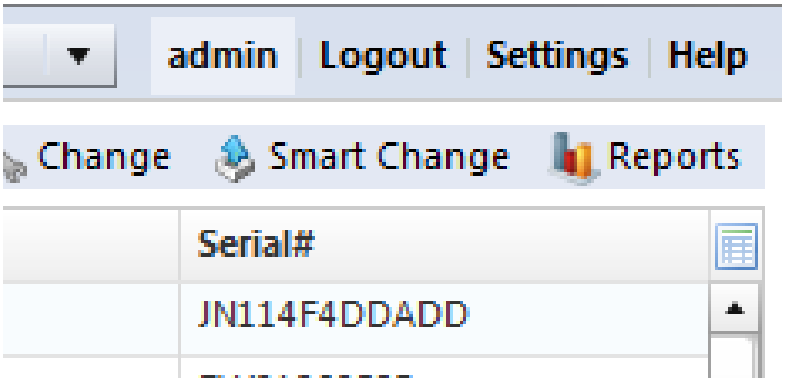


Click on the OK button to save the user.

3.2.3 Quick Password Change

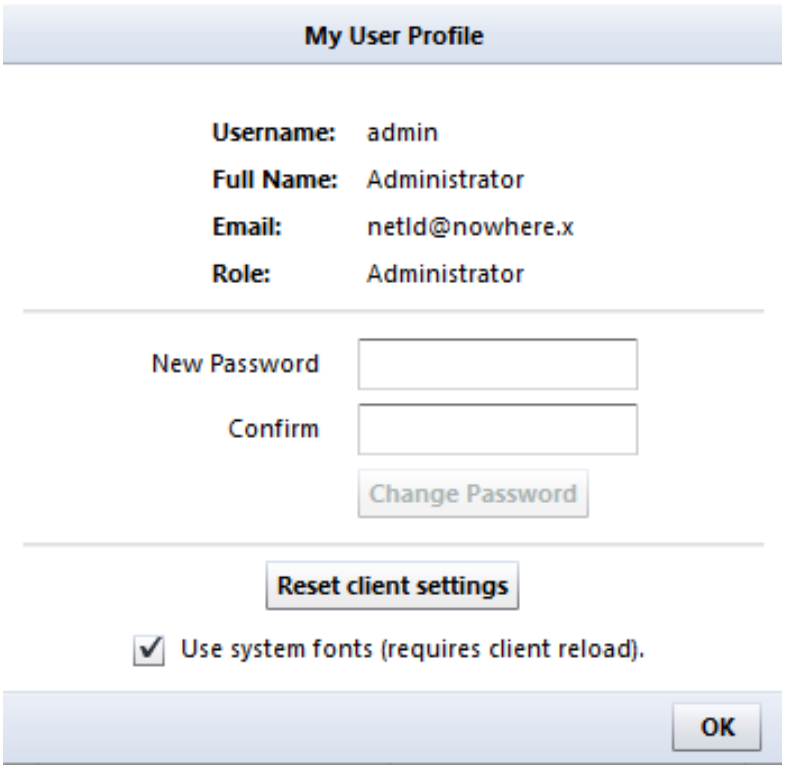
There is a shorthand method to change the password if you are currently logged in as a user (only your own password can be modified.)[3]

Click on your own login username in the global menu. In the example below, "admin" is the username, shown on the left of "Logout".



[3]This feature is not available for users who logged in via RADIUS server authentication.

Enter the new password in both New Password and Confirm fields. Then click on Change Password button to save the new password.



3.3 Tools for Devices

3.3.1 Adding Devices

Devices can be added, modified, deleted, backed-up, tagged and searched for, but the most important feature among these is adding the devices. Just as you have done in the tutorial, there are two ways to add devices to netLD inventory:

- The Automatic Discovery feature
- Adding devices manually

In order to discover the devices automatically, you have to configure both netLD and the device itself. If you encounter any trouble, first check Fig. 3.3.1.

Both menus for adding the devices are placed under *Inventory* → *Add* section in the *Tools Menu*. *Add new device* is for the manual process and *Discover new devices* is for the automated discovery.

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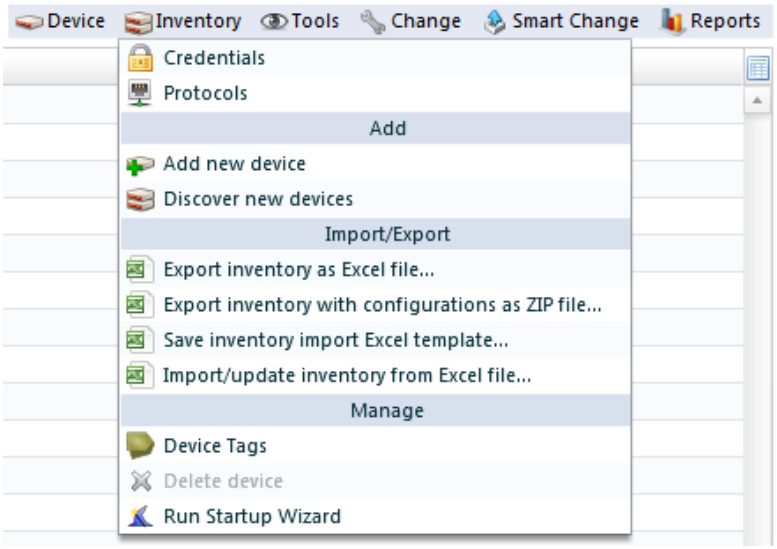
Figure 3.3.1: Requirements for Device Discovery.

1. your device is SNMP-compatible, and its SNMP feature is turned on,
2. you have registered all necessary information in the previous section, and
3. you have resolved any port-conflicts between netLD and other firewall/anti-virus software in your network. The port usage is listed in the Data section (Chapter 7)
4. The maximum number of IP addresses discovered is 66,000. We consider this is a sufficient number because it is clearly a vast IP space for this enterprise-class software. For instance, 10.2.x.x already contains 65,025 addresses.

Figure 3.3.2: Inventory → Add



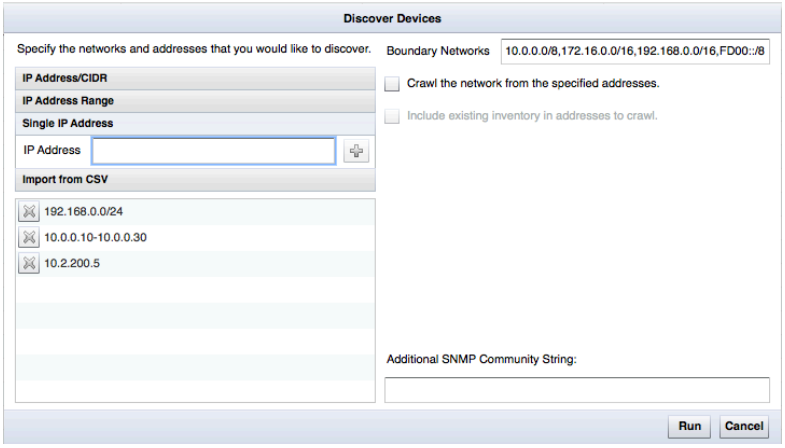
3.3.2 Discover New Devices

Device Discovery is a wonderful tool as long as your devices follow the conditions described in Fig. 3.3.1.

During the discovery, netLD first asks each device in the given IP address range if they made their ports open to netLD so that netLD can make a connection. If the answer was positive, it makes the device send an SNMP packet to the netLD host server. The device is then added to the Device View with the SNMP information.

To run the Discovery, open *Discover new devices* and follow the instruction below:

Specify all IP addresses or ranges to discover. Enter the IP/ranges in corresponding menu and click on . Added elements are listed in the box located at the bottom of the menu.



Menu Items Example and Description

IP Address/CIDR Enter IP address/CIDR of the network to discover. (e.g.192.168.0.1/24).

IP Address Range Enter 2 IP addresses to specify the address range to discover. (e.g. 10.0.0.1-10.0.0.100).

Single IP Address Enter an IP address of the single device to discover. (e.g. 192.168.0.1).

You can also import the range data from a text file (CSV). Write the discovering addresses or networks in each line.

	A	B	C	D	E	F
1	10.0.0.1-10.0.0.10					
2	192.168.0.0/24					
3	172.16.0.1					
4						

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Descriptions of the other options follows:

Boundary Networks Enter the boundary network addresses to limit the range of discovery. 10.0.0.0/8, 172.16.0.0/16 and 192.168.0.0/16, FD00::/8 are set by default, and if you want to extend the search range, add a new address range in this field.

Crawl the network from the specified addresses Enable this checkbox to recursively crawl and add the neighboring devices to the inventory.

Include existing inventory in addresses to crawl Enable this checkbox to enable crawling on the neighbors of the devices that already exist in the inventory.

Additional SNMP Community String Enter a community string to give prior use for discovery.

Finally, click on the *Run* button to start discovery, and the devices are added to the inventory. Discovery status is going to be show up in the status pane. †[4]

Status	Description
Device added.	The device has been successfully discovered and added to the device inventory.
There was no SNMP response.	The device has responded to Telnet, SSH or ping but did not respond to SNMP request.
No adapter matches.	The device has responded to SNMP request but netLD does not have the adapter for the device.
Server protocol settings for SNMP for this device are disabled.	SNMP protocol in Inventory→ Protocols settings is disabled for the network group.
There was no ICMP ping response.	The device did not respond to ICMP ping request. (only in Single IP Address discovery)
Unable to establish TCP connection on port 22(Telnet) or 23 (SSH).	netLD failed to connect neither to port 22 nor 23 of the device (only in Single IP Address discovery)

During the discovery, netLD uses SNMP version 1 by default. To change the setting, use *Inventory* → *Protocols* menu and select the proper SNMP option.

[4]The discovery result only shows the devices which have responded to the Telnet/SSH/ping. Details for discovery status follows:

3.3.3 Adding Devices Manually

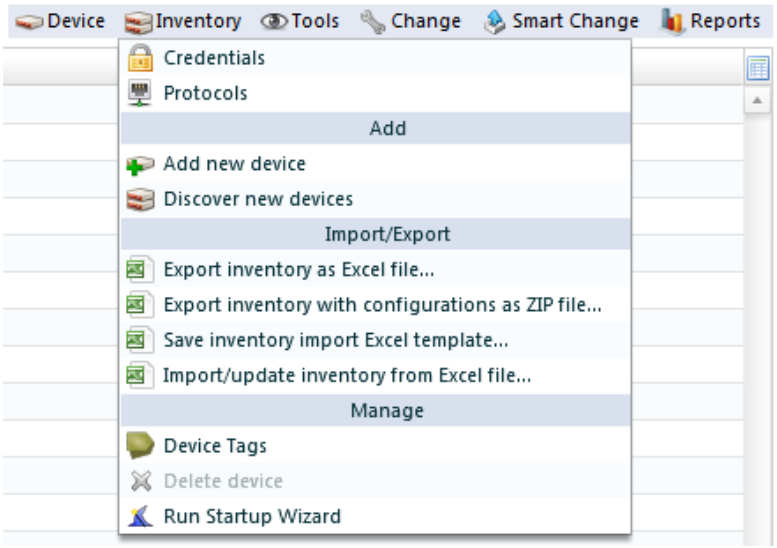
You can also add the devices manually. Go to *Inventory* → *Add New Device* and you can add each device manually.

Menu Items	Description
IP Address	Specify an IP address of the device to add.
Adapter	Select adapter ID from the dropdown list of the device to add.

Alternatively, you can do the same thing by importing a handwritten or the exported spreadsheet. This is described in Sec. 3.3.6.

We also provide a template spreadsheet to fill in the IP addresses etc. This is available in *Inventory* → *Save inventory import Excel template.*

Open the Inventory submenu and save the template.



Open and edit the exported Excel file. When you finish editing the file, import it with the *Import/Update inventory from XLS file...* menu and confirm all devices are added in inventory list.

	A	B	C	D	E	F	G	H	I	J	K	
1	IP Address	Network	Adapter ID	Hostname	Type	Vendor	Model	OS Version	Serial Number	Memo	Custom 1	Cust
2	10.0.2.1	Default	Juniper ScreenOS	ssg5								
3	10.0.2.2	Default	NEC IX	IX2025_LVI	Router	NEC	IX2025	8.5.21	12TNU01048			
4	10.0.2.3	Default	Yamaha RT/RTX	RTX1200	Router	Yamaha	RTX1200	10.01.22	D26059822			
5	10.0.2.5	Default	Apresia	Apresia_LVI	Switch	Apresia	Apresia3424GT-SS	7.22.01				
6	10.0.2.6	Default	Cisco IOS	C3640	Router	Cisco	CISCO3640	12.3(11)T	26433110			
7	10.0.2.7	Default	D-Link DGS	DGS3426	Switch	D-Link	DGS-3426	2.62.B61	P1AJ1A2000040			
8	10.0.2.30	Default	Extreme Extremeware	Summit48i	Switch	Extreme	Summit48i	7.3.2.3	0145M-01540			
9	10.0.2.50	Default	Alaxala AXS	AX2430S	Switch	Alaxala	AX2430S-24T	10.4	85G015			
10	10.0.2.254	Default	Cisco IOS	LVI_Router	Router	Cisco	CISCO1841	15.1(1)T	FHK142172C3			

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Figure 3.3.3: Specify the Version via the corresponding pull-down list.

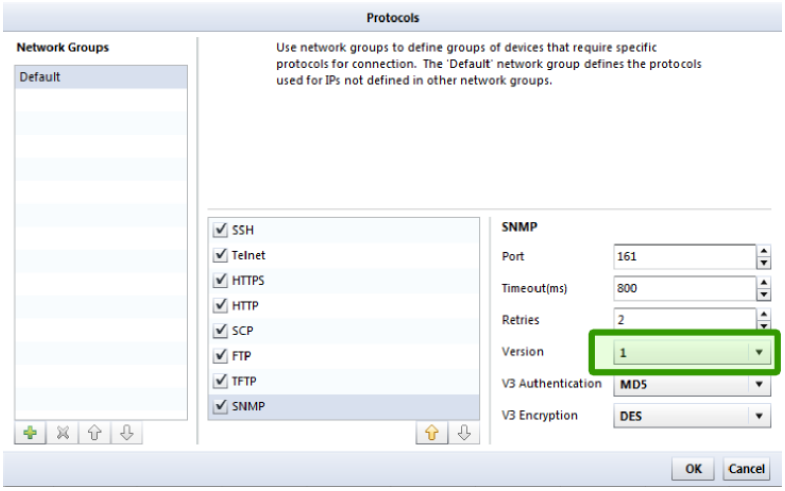


Figure 3.3.4: Enter the IP address and the adapter.

Parameter	Description
IP Address (Required)	Specify an IP address of the device to add.
Network (Required)	Enter an existing network group to assign the device.
Adapter ID (Required)	Enter the device adapter ID of the device.
Custom 1~5	Optional text for the custom field.

Finally, click on the *Inventory* → *Import/update inventory from Excel file*. The same feature can also be accessed from *Run Startup Wizard* → *Import from Excel*.

3.3.4 Editing and Deleting the Devices

Although it is not a common practice, when you want to edit the IP Address, Hostname, Adapter ID, Network and Custom Fields of the specific device, click on the row of the device to edit and go to *Device* → *Edit Device properties*.

When you delete a set of devices, select the devices and go to *Inventory* → *Delete device*.

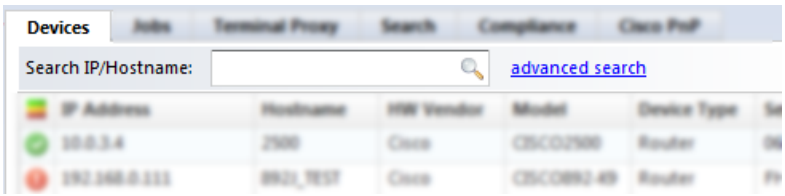
3.3.5 Searching Devices

In Device View, netLD provides a flexible search and filter function of the devices. There are two modes of the search function, Basic and Advanced Search, where the former is set as the default method. Note that the Filtering is done only within a same network. To change the current Network, select it in the drop down box in the global menu.

Basic Search

You can filter devices by just entering an IP address or a hostname in the search pane. It supports an incremental search feature, so the elements are gradually filtered as you type.

Figure 3.3.5: Simple-search pane. If you click on a label advanced search, the *advanced search pane* will show up.



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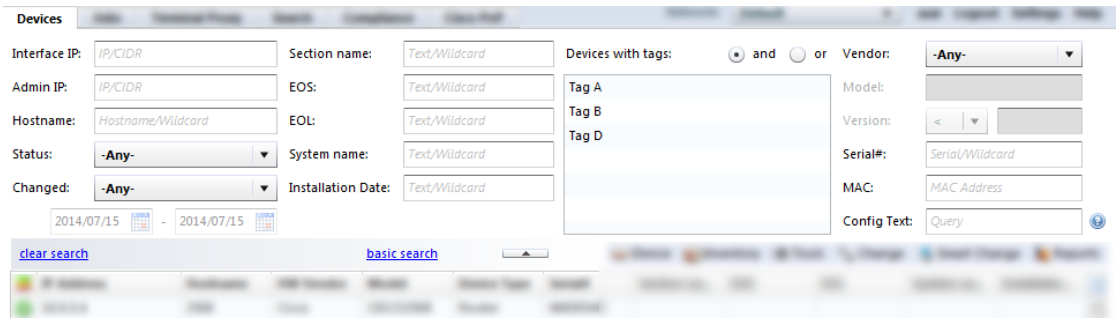
Advanced Search

Compared to the Basic Search, Advanced Search supports plenty of filters. Turn on the Advanced Search mode via "advanced search" button in the Device View. The search can be done as you type.

Figure 3.3.6: Advanced Search panes.



Names for each custom field may be different if they were changed in Setting → Server Settings → Custom Device Fields menu.

IP/CIDR Enter an IP address/CIDR (e.g. 10.0.0.1 or 192.168.0.1/24)

Admin IP Enter an IP address. Note that only the devices already added in the Inventory are subject to the search.

Hostname Enter a hostname (e.g. J2320 or J23*).

Status Select a backup status from the dropdown list.

Changed Select the time that the last backup was done.

Custom 1 to 5 Enter any text. It matches the custom field of each device (e.g. lvi, netLD, net, etc.)

Device with tags Select a device tag name from the list. You can use *and/or* radio buttons to toggle how queries are combined.

Vendor Select a device vendor name from the dropdown list.

Model Enter a model name to filter devices by model name (e.g. J2320, J23*, etc.)

- This optional filter is available when the Vendor filter is used.

Version Enter a version number of the devices' Operation Systems and select an operator from the dropdown list. (e.g. `> 9.2`)

- This optional filter is available when the Vendor filter is used.

Serial# Enter a serial number in this field to filter devices by serial numbers. (e.g. 01621220*)

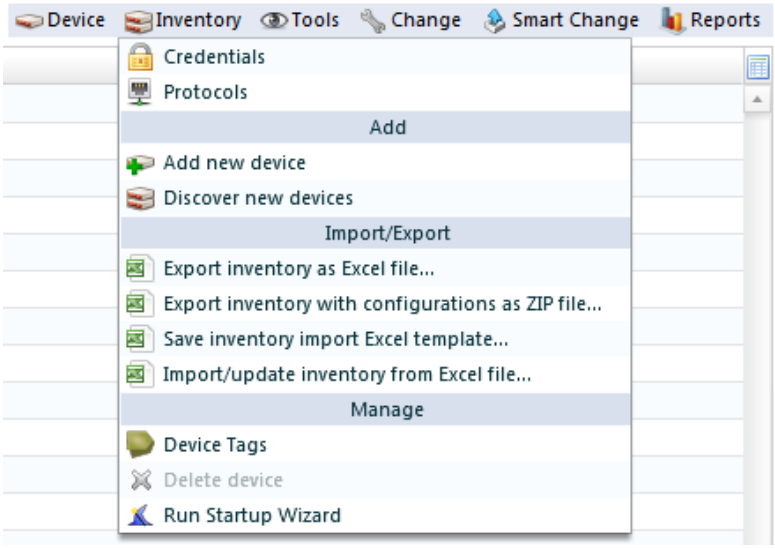
MAC Enter a MAC address (e.g. 000CCEC6EAE0). Only the full match is available and partial match is not supported right now.

Config Text Config Text search runs a full-text search in the device configurations. For example, if you want to search the configurations that contain "version" and "12.1", enter "version AND 12.1" in Search field and click on button. For details about the search query, refer to Query Syntax located in the right of the query field.

3.3.6 Exporting and Importing the Inventory

You can import and export the current Inventory status in a spreadsheet. These operations are available in *Inventory→ Import/Export* section. The form includes the IP address, the hostname and so on.

Figure 3.3.7: Inventory submenu.



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Exporting Inventory in a Spreadsheet

Select some of your devices and click on the *Export inventory as Excel file* entry, then you can save the sheet into a `.xls` file such as `netLD-inventory (2014-03-25).xls`. If you export all devices in the inventory, *empty* the selection and then run the export.

Similarly, you may also export a ZIP archive containing the data if the sheet gets too large. This option is available in *Export inventory with configurations as ZIP style file*. The output file is named such as "netLD-configs (date of export).zip". The files in the archive are organized into subdirectories as follows:

- `<filename>.zip`
  - `<network name>`
    - 10.0.0.1 (1812J-B)
    - 10.0.0.201 (cisco2500b.intra.dar.co.jp)
    - 10.0.0.203 (cisco2600a.intra.dar.co.jp)
    - 10.0.0.208 (C2801)
    - ...

Importing the Exported File

Also, you can then import(=add) and update(=overwrite) the exported spreadsheets. Click on the *Import/update inventory from Excel file* entry. It allows you to add a number of devices at once.

3.4 Configuration and Backup

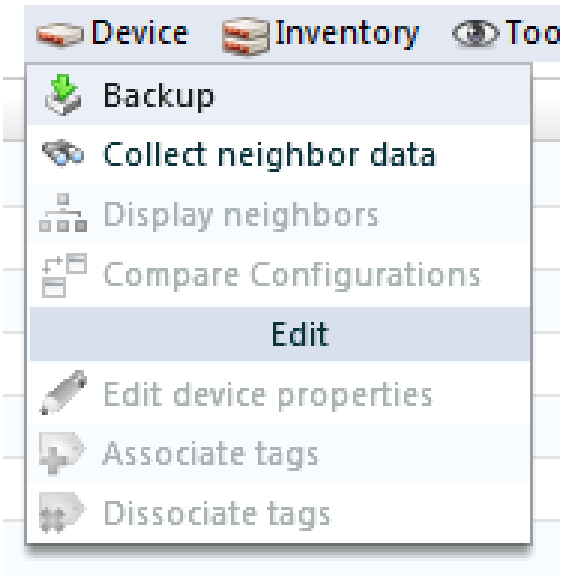
Configuration backup of devices are done via a set of commands corresponding to the model of the device. IOS devices, for example, can be backed up via the following sequence of commands:

```
copy running-config tftp
copy startup-config tftp
show access-lists
show diag
...
```

What netLD does is to automates these command-line sequences. Since these commands vary among the vendors, maintenance of large number of devices by hand is quite inefficient, and there are many *reinventions of wheels* in each developer's personal shell scripts.

To take the backups of all the devices in Inventory, simply click on *Device* → *Backup* without selecting any device. If you want to backup certain devices only, select the devices prior to clicking the button. Alternatively, you can run the backup via the right-click menu which shows up when you select the devices and right-click the selected entries on the Device View.

Figure 3.4.1: Via the menu button



Once the backup is successfully performed, the information in Device View/Inventory is updated.

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3.4.1 Status Summary

Status icons in status pane show the status of the last backup performed. Each icon means the following:

Status	Description	Available Action in Status Summery
	Successes w/ Changes	The backup was successful and more than one change was found in the configuration.
	Success w/o Changes	The backup was successful but there is no change in the configuration from the last backup.
	Invalid Credentials	The icon indicates that the backup was inhibited during the authentication, which means the registered credential set was incorrect. If you click on the row, the error log shows up in the bottom. If you double-click on the icon then the Credentials dialog shows up, which is identical to what you find in Inventory → Credentials, and you can check the current credential information.
	Failures	The icon indicates that netLD has failed to backup the configuration due to the other causes. If you click on the row, the error log shows up in the bottom. See Section 10-4 Status after Performing Backup for clearing each error.

3.4.2 Status after Performing Backup

Status icons in the leftmost column in the device list show the backup status. You can see the detail by double-clicking on the icon.

Status	Description	Reason
	Backed Up	The configuration is backed up successfully.
	Configuration Mismatch	The `running-config` and `startup-config` were different. (Sec. 3.4.6)
	Invalid Credential	The credential set for the device was incorrect. If you double-click on the icon, Backup Error Detail dialog shows up. Review credential settings in Inventory → Credentials menu for the device.
	Backup Failed	
	`UNAVAILABLE_PROTOCOL`	netLD could not access devices with certain protocols. Review the configuration or check the hardware, and also the Ethernet connection.
	`UNEXPECTED_RESPONSE`	The unintended answers are returned from the device. If you still have any troubles accessing the devices even after checking Credentials and Protocols, please contact to our support.
	`DEVICE_MEMORY_ERROR`	The `startup-config` is missing on the device.
	Compliance	
	Compliance Warning	The configuration contains a violation of compliance, which signaled a severity level Warning. Details are described in the later sections. (see Sec. 3.10)
	Compliance Error	The configuration contains a violation of compliance, which signaled a severity level Error.

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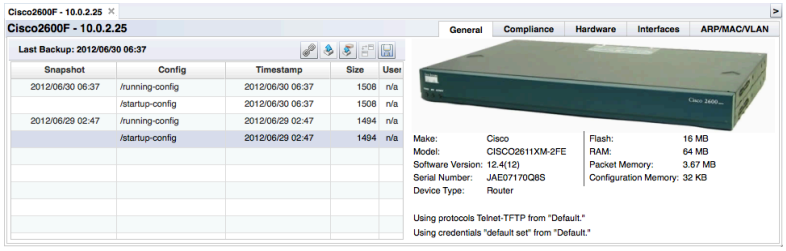
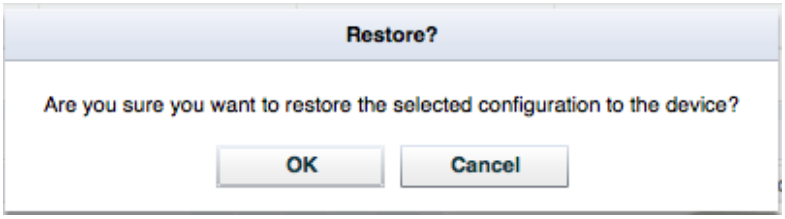
3.4.3 Restoring the Configuration

netLD allows you to restore the past configuration of a device. double-clicking on a device in Inventory shows its backup history in the status pane. Select a configuration to restore and click on *Restore the configuration* button .



Once you click on the OK button in the confirmation dialog, it starts restoring the configuration.



At this point, internally, netLD issues `copy tftp startup-config` command to copy the selected configuration to the device's `startup-config`. After reloading the device, restored configuration is applied.
See Also: Sec. 2.3.2 †[5]

3.4.4 Device Property

Details of device hardware information and configuration backup are available by double-clicking on the device row. Information included in device property contains information that netLD has collected from the device in the backup and the neighbor information. Latest information can be obtained explicitly, by performing the backup or correcting the neighbor information.

[5]Uploading a configuration again relies on the protocol settings. Therefore you must specify the correct protocol to upload the configuration prior to the restoration. (See Sec. 2.3.2 (Protocols) for details.) For example, you need to enable TFTP in *Inventory* → *Protocols* menu for Cisco IOS configuration.

However, if you did not change the protocol from the default settings you do not have to care much about that because all protocols are enabled in the default Protocol settings.

Figure 3.4.2: Via the right click

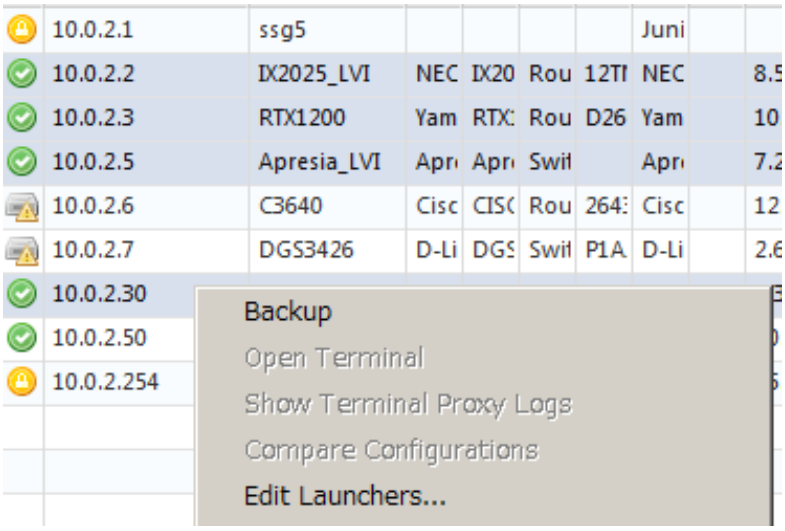
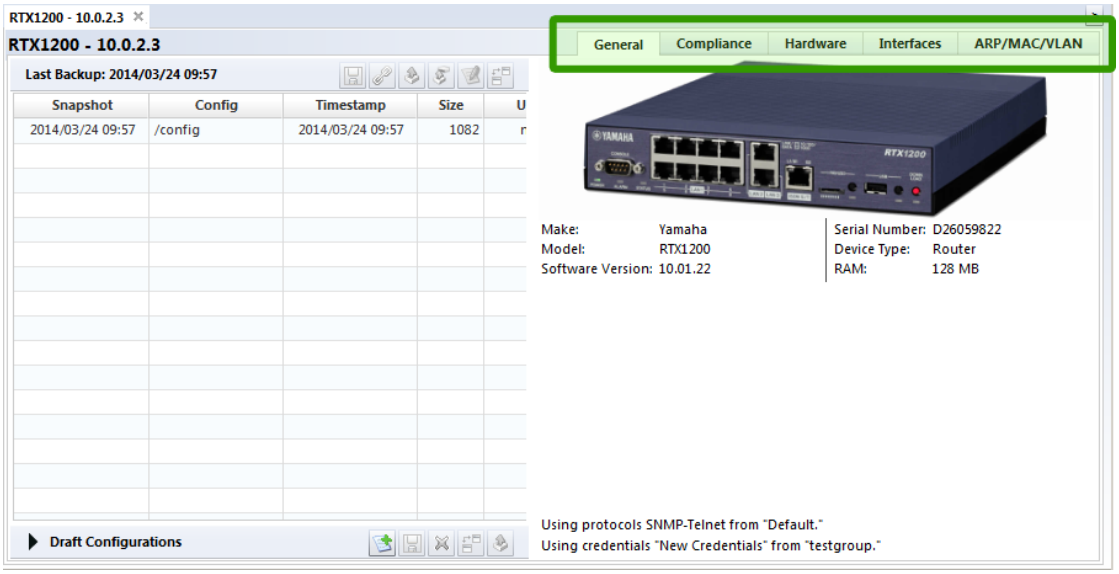


Figure 3.4.3: Opening a device property in the status pane.



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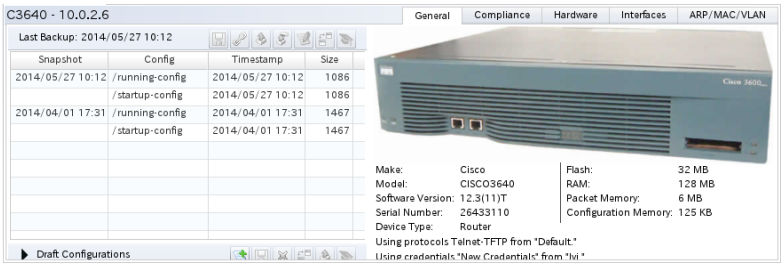
General Tab

General tab displays the configurations or specifications of the devices. Note that information shown in this tab is based on the last backup netLD performed.



Compliance Tab

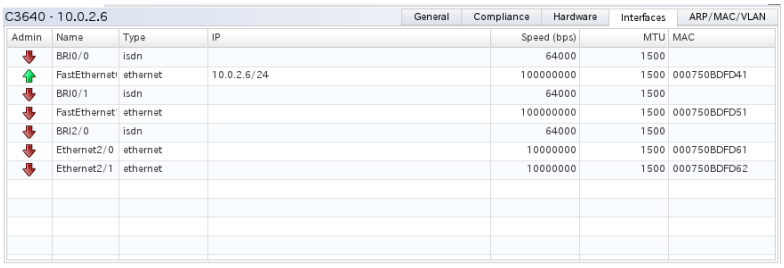
Compliance tab shows the violation contents if the device has violation against enabled policy. For more details, please refer to the Compliance section Sec. 3.10, p.116.

Hardware Tab

Hardware tab shows the hardware information of the device based on the last backup information.

Interfaces Tab

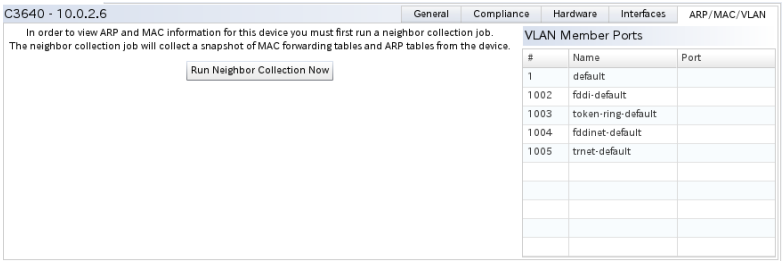
Interfaces tab shows the interface status of the devices based on the last backup information.



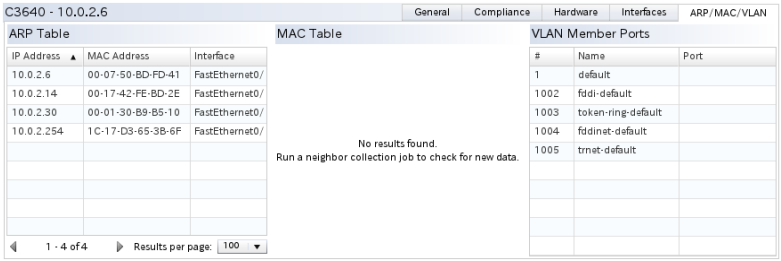
ARP/MAC/VLAN Tab

ARP/MAC/VLAN tab shows ARP table, MAC table and VLAN member ports information of the device. Note that information shown in this tab is based on the last collect neighbor job netLD performed.

Before collecting the neighbor information, nothing is shown in left subpane. Click on the *Run Neighbor Collection Now* to run the neighbor search.



And the result information is shown here.



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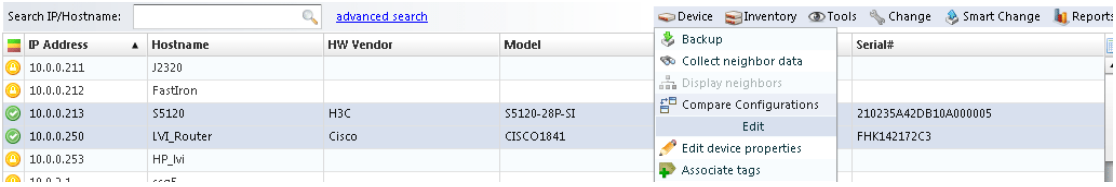
3.4.5 Comparing the configurations

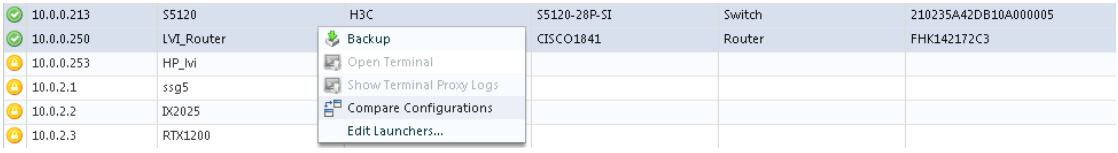
There are two style of comparison available: comparison among devices or along the history (the timeline). If you compare the configurations of two devices (in the different or the same timestamp), then you should initially select two devices. Otherwise, you compare the configurations of single device at the different timestamps and you should select one device in this case.

While selecting the device/s to compare, click on the *Device* → *Compare configurations* or in the right-click menu.

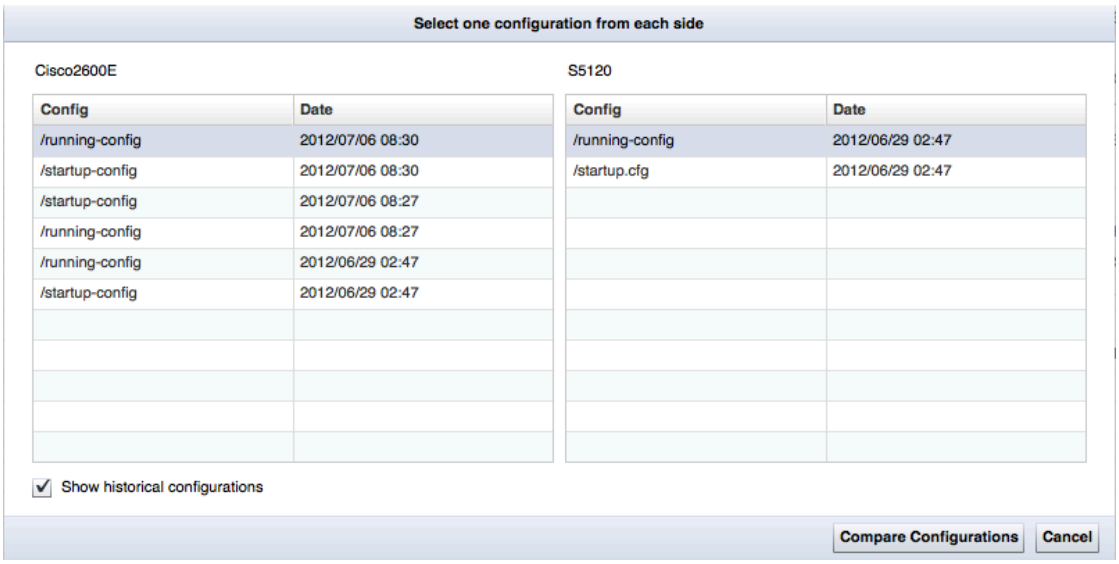
Access this feature via the tools menu.



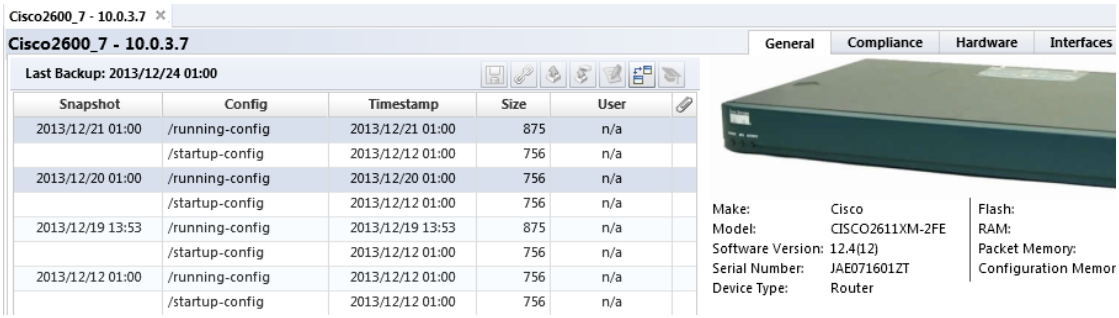
Alternatively, access the feature using the right-click menu.



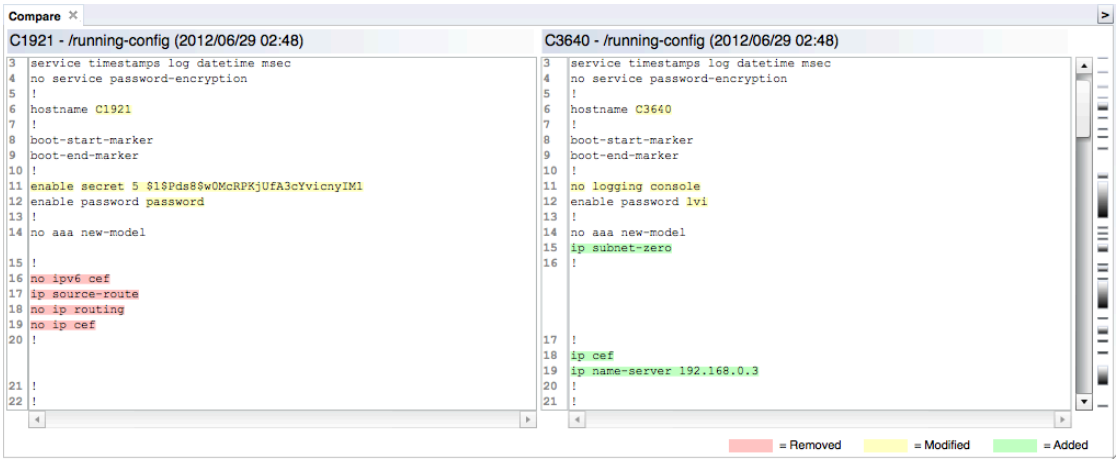
Select the configurations to compare and click on the *Compare Configuration* button. When you compare the historical configurations, check on *Show historical configurations* and the old configurations would appear in the list.



More conveniently, we can also compare the configurations on the Device Information. Select two of them in the list and click on the upper-left icon. Currently we do not provides right-clicks on the device information.



The configuration diff is displayed in colors; red = removed, yellow = modified, and green = added.



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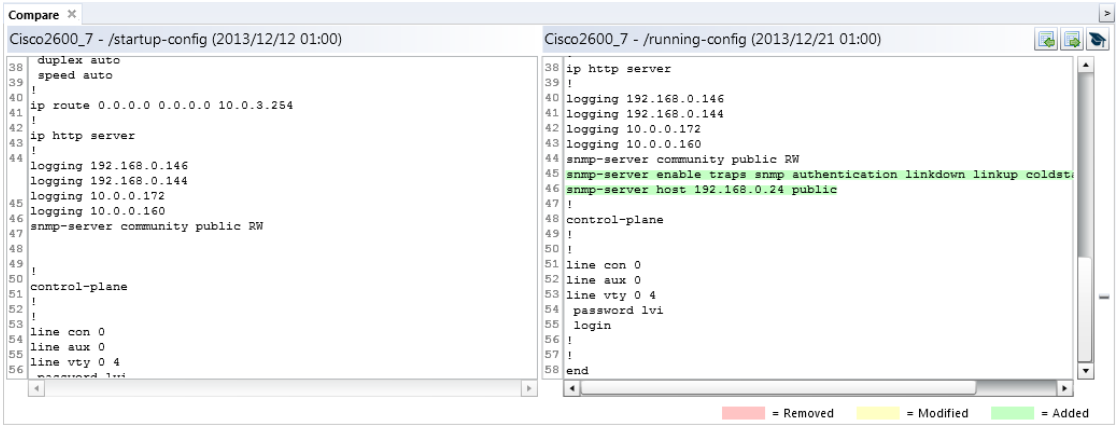
3.4.6 Checking the Mismatch in startup-config and running-config

Configuration Mismatch is signaled when you have a device that has two configurations called `running-config` and `startup-config`, and the two configurations differ to each other. `startup-config` is a configuration that is used when a device is rebooted, and it is supposed to be used in the regular operations, while the `running-config` is a temporary configuration. If someone made changes to the `startup-config` but forgot to restart the device, it is highly likely that your network is handled incorrectly. Also, If someone made changes to the `running-config` though they think the changes should be permanent, then the changes will be reset upon startup, and again the network is configured incorrectly.

If the device status indicates the configuration mismatch ( ), double-click on the icon to display configuration comparison in the status pane. Click on the buttons at the upper right corner of the screen to overwrite the startup configuration with the running configuration, to revert the running configuration to the startup configuration, or revert the running configuration to the startup configuration using the change adviser.

Figure 3.4.4: Comparison pane of a `startup-config` and `running-config`.

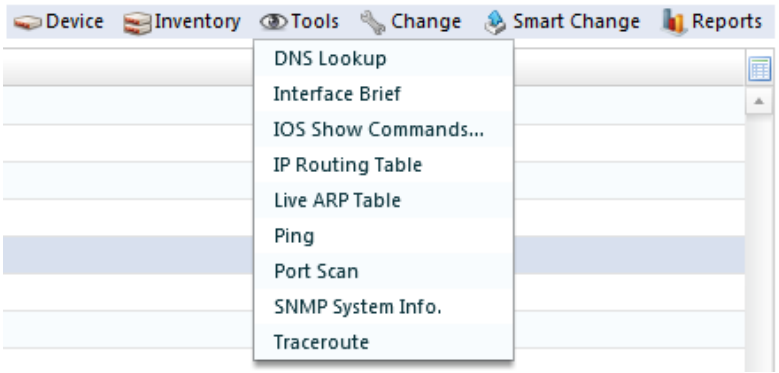


[6]This feature is not available for all devices because some devices do not have `running-config` and `startup-config`. netLD does not show this icon ( ) for some devices even if there is a compliance violation.

3.5 Tools Menu

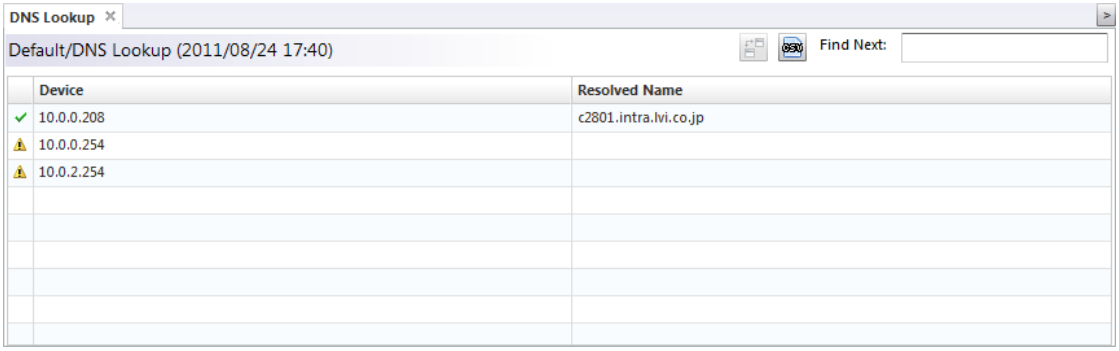
Tools in *Tools* menu check the real-time status of the selected devices. You can export the accumulated results by clicking on the CSV button ( ) at the upper-right corner in the corresponding view in the status pane.

Figure 3.5.1: Tools Menu.



3.5.1 DNS Lookup

It shows the result of DNS name resolution of the devices.



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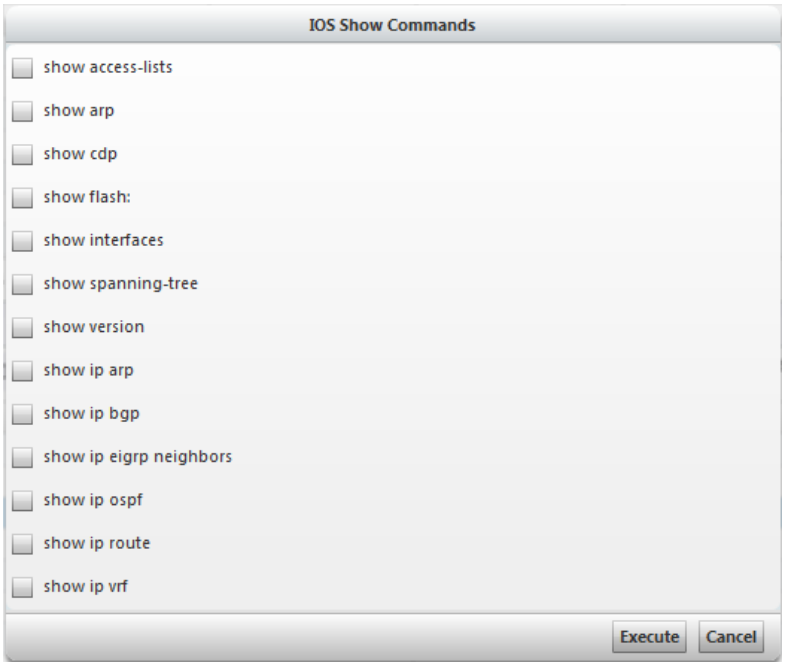
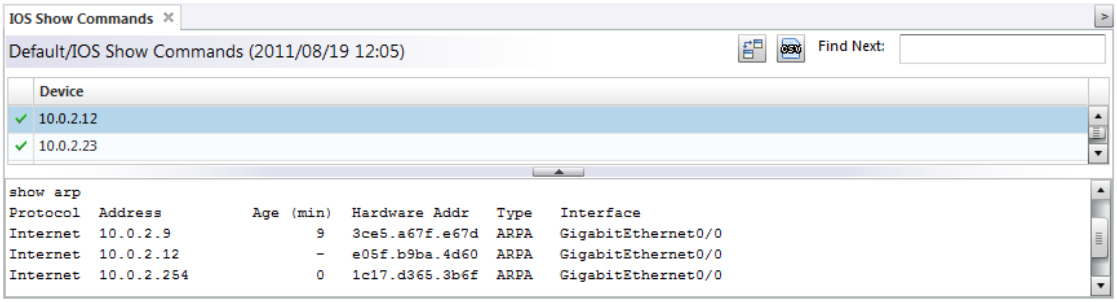
3.5.2 IOS Show Commands

It runs IOS *Show* commands on the device and shows the results. In the list, there are several commands you run. Note that this operation is available only on devices that are Cisco IOS compatible.

Select which command to run on the device. Then click on the *Execute* button.

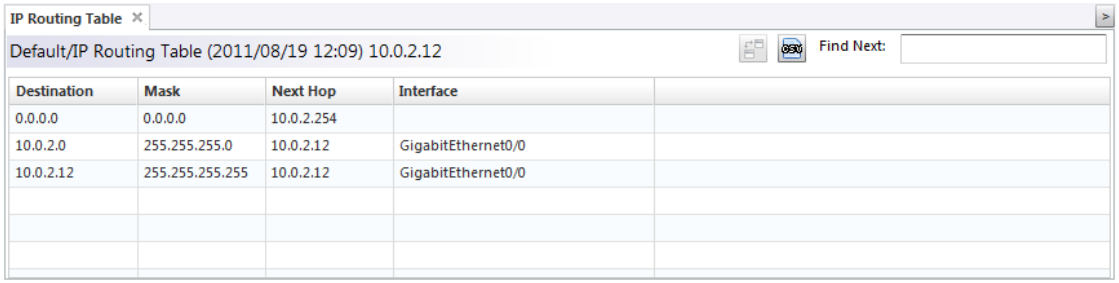


An example of running `show arp` on the selected devices with the *IOS Show Commands*.



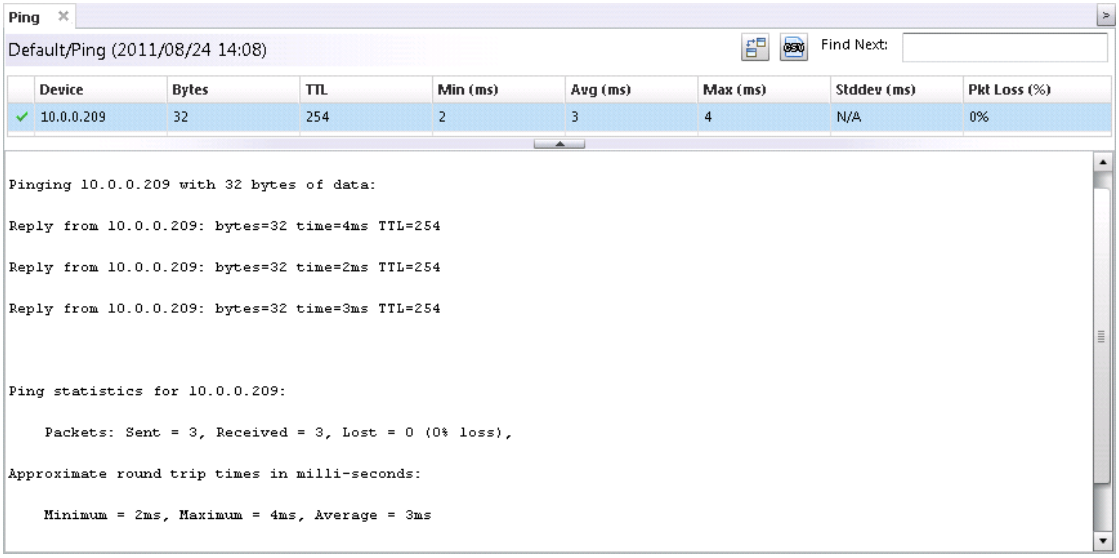
3.5.3 IP Routing Table

It shows the routing information of the device.



3.5.4 Ping

It sends a ping to the device and shows its response.



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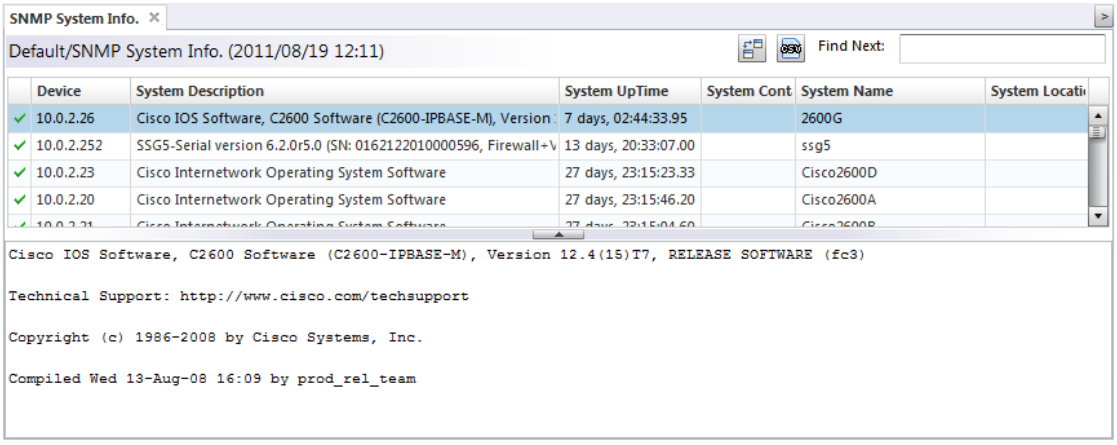
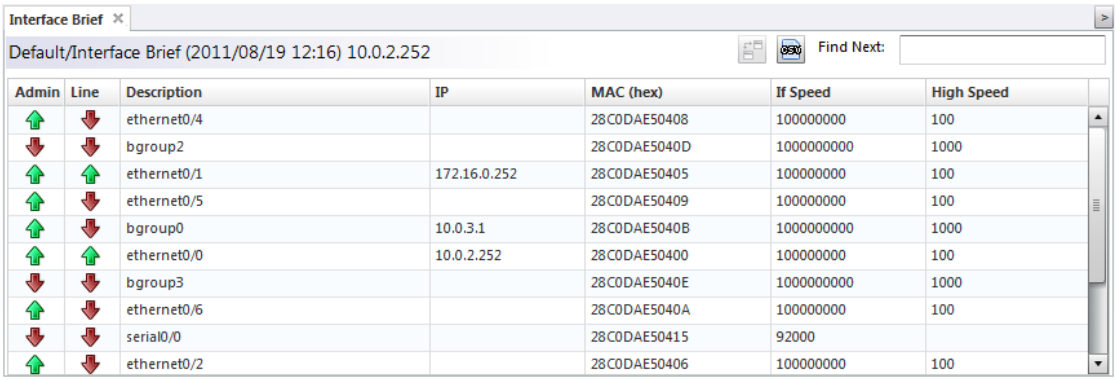
3.5.5 SNMP System Info.

It shows the SNMP system information of the devices.



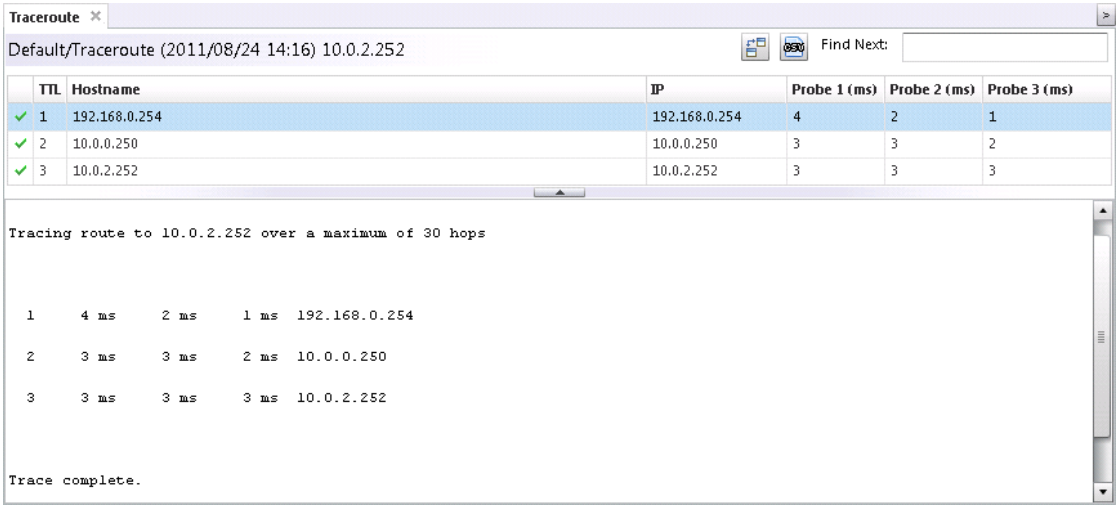
3.5.6 Interface Brief

It shows the IP addresses of the device and UP/DOWN status of the interfaces on it.



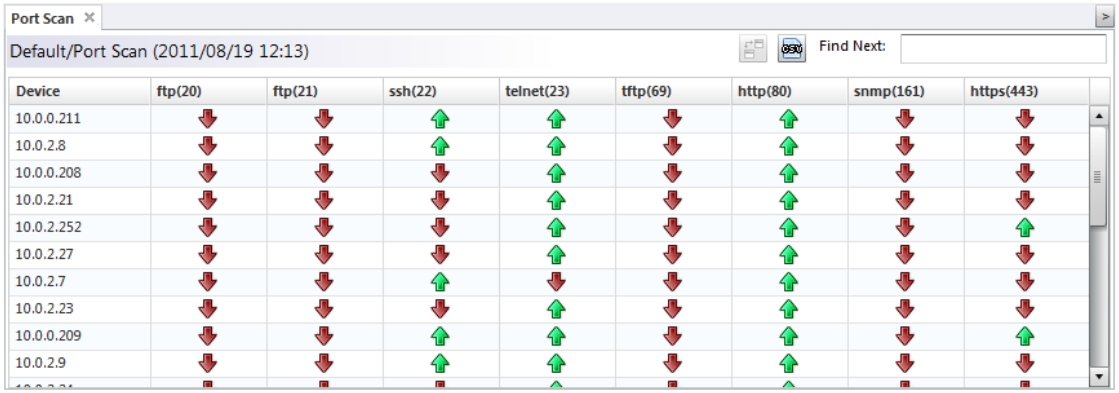
3.5.7 Traceroute

Sends traceroute to the devices and shows the responses.


Traceroute
Default/Traceroute (2011/08/24 14:16) 10.0.2.252
Find Next:
TTL Hostname IP Probe 1 (ms) Probe 2 (ms) Probe 3 (ms)
1 192.168.0.254 192.168.0.254 4 2 1
2 10.0.0.250 10.0.0.250 3 3 2
3 10.0.2.252 10.0.2.252 3 3 3
Tracing route to 10.0.2.252 over a maximum of 30 hops
1 4 ms 2 ms 1 ms 192.168.0.254
2 3 ms 3 ms 2 ms 10.0.0.250
3 3 ms 3 ms 3 ms 10.0.2.252
Trace complete.

3.5.8 Port Scan

Shows port usages of the devices.



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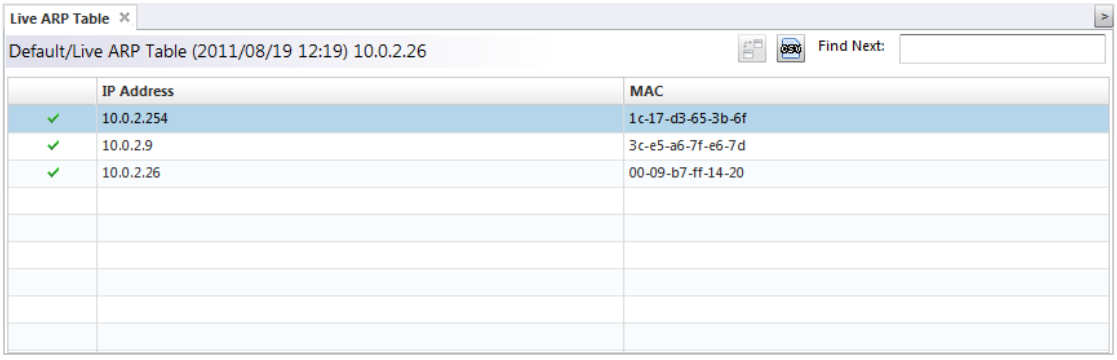
3.5.9 Live ARP Table

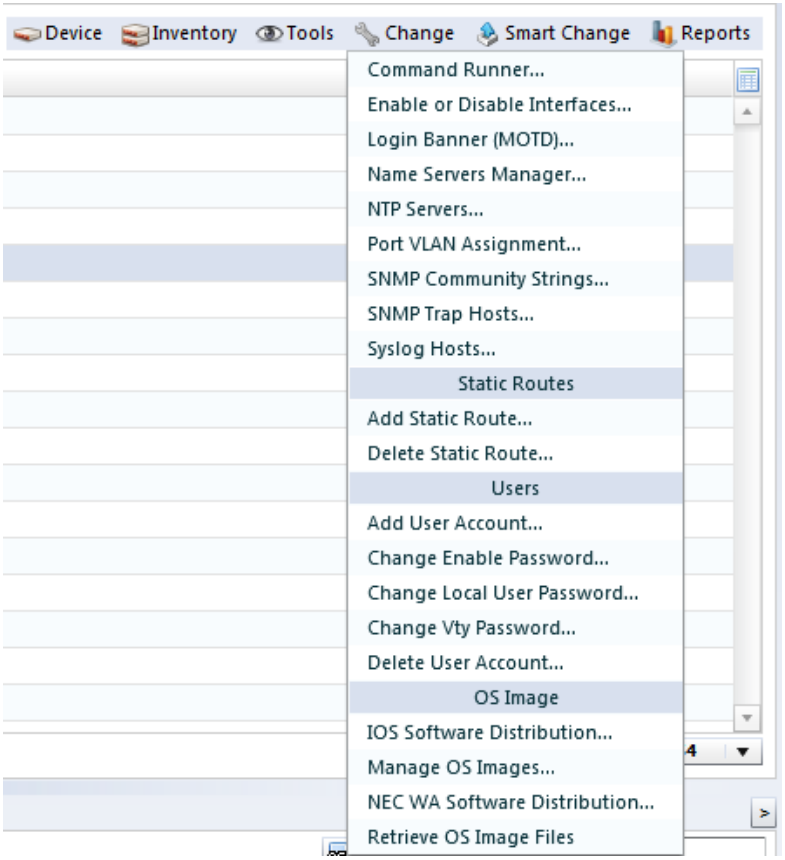
Shows the real-time status of ARP table of the devices.



3.6 Change Menu

(Configuration) *Change tools* perform operations related to the configuration changes on the selected devices. They are all located under *Change* submenu. In this section, we describe each feature in this submenu from the top to the bottom.

Change tools are placed under *Change* submenu in the tools menu.



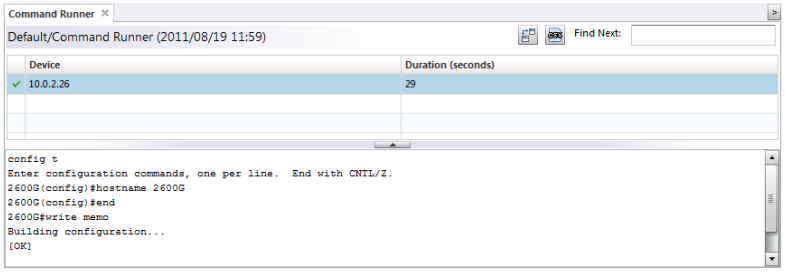
3.6.1 Command Runner

Command Runner eases the effort of managing your devices by automating the iteration over them, e.g. you can schedule the execution of the hundreds of lines of commands with just one click. Available commands include those for fetching or pushing the configurations.

†[7]
†[8]

After the required fields are filled in, click on the Execute button.

The results are shown in the status pane.



[7] *Override the default prompt regex* specifies the regular expression that matches to a specific prompt (like `PS1` variable on the shell) on the device.

Specifying this field is required if some operation use the special input prompt, e.g. interactive input might respond with a prefix `>` on each line while the normal command responds with a prefix `<username>#`. In this case, you should specify a regular expression `^<` (a line starting with `<`). Otherwise, netLD fails to distinguish the command output and the prompt for the next input.

[8] However, you cannot respond to the input query interactively while iterating over the devices.

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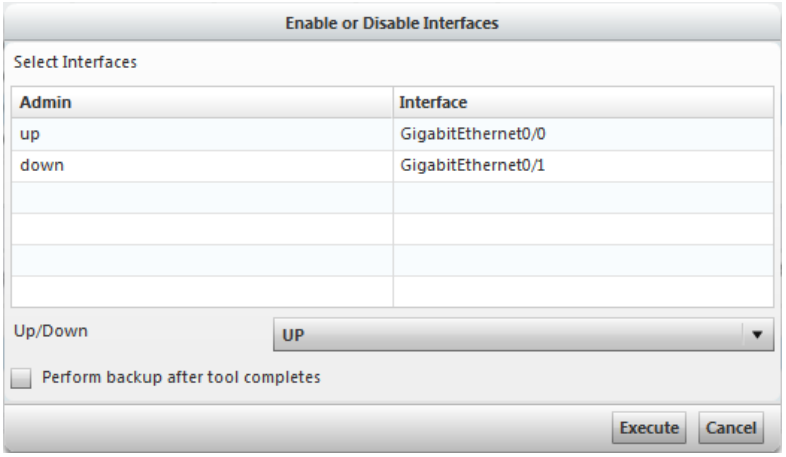
3.6.2 Enable or Disable Interfaces

It allows you to change the admin status of interfaces of the device.

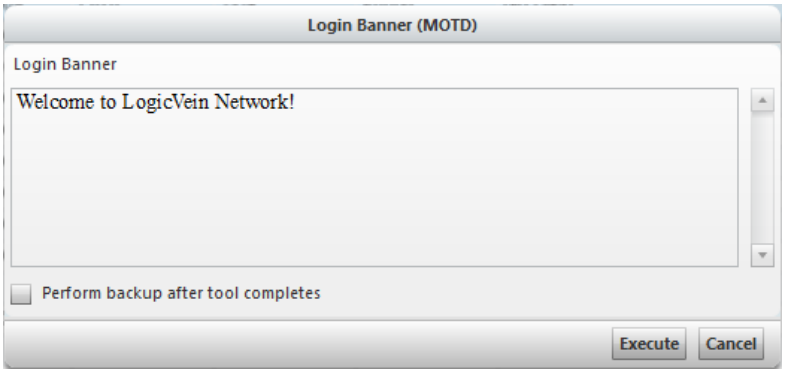


Select interface/s and select UP or DOWN to change from the dropdown list.

Note that, if the interface which is going to be DOWN is the only interface you can connect to the device in the network, you no longer connect to that device in the same measure after that.

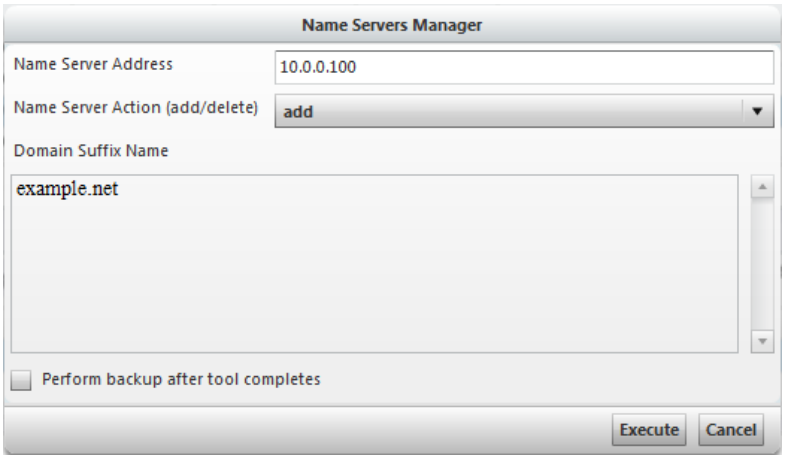
3.6.3 Login Banner (MOTD)

Changing the MOTD login banner of the devices.



3.6.4 Name Servers Manager

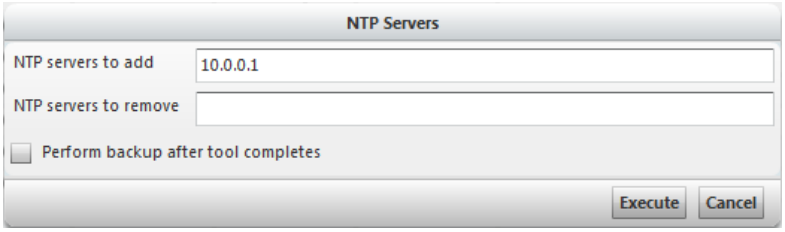
It allows you to add or delete a name server of the devices.



Menu Items	Description
Name Server Address	Enter IP address of the name server.
Name Server Action (add/delete)	Select action for the name server from the drop-down list to add or delete.
Domain Suffix Name	Enter the domain suffix name.

3.6.5 NTP Servers

Adds/removes NTP servers to/from the devices.



Menu Items	Description
NTP servers to add	Enter the IP address of the NTP server to add.
NTP servers to remove	Enter the IP address of the NTP server to delete.

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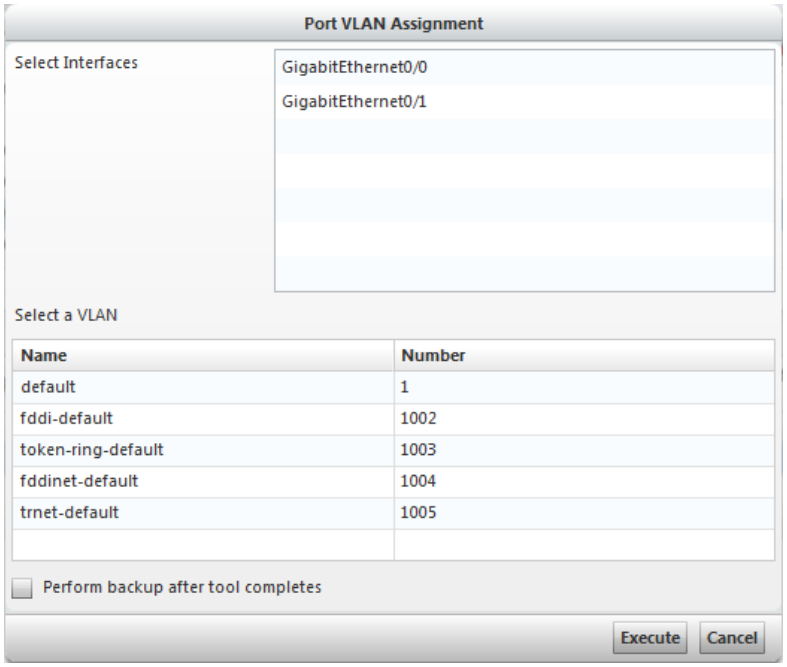
3.6.6 Port VLAN Assignment

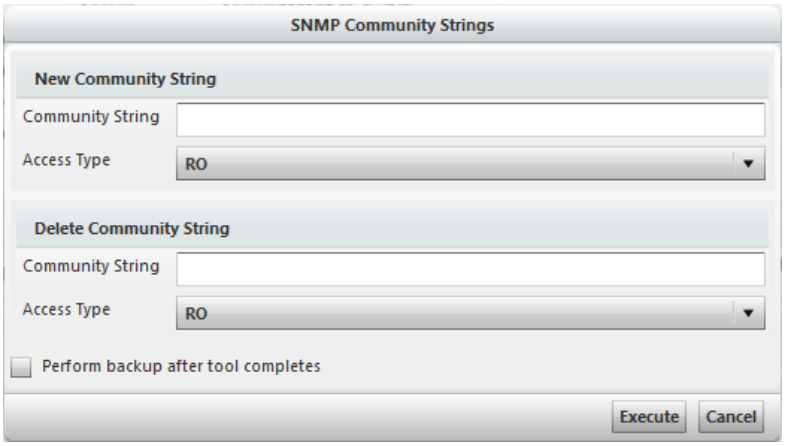
It allows you to assign VLAN ports to the interfaces of the device.



After selecting one or more interfaces from the Select Interfaces list and the VLAN name to assign, click on Execute button to run the tool.

3.6.7 SNMP Community String

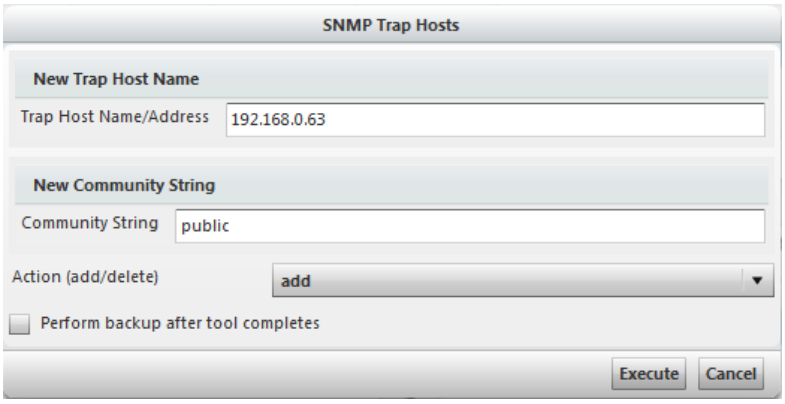
It allows you to add or delete a SNMP community string for the devices.



Menu Items	Description
Community String	Enter SNMP community string to add or delete.
Access Type	Select access type of the community string to add or delete from the dropdown list.

3.6.8 SNMP Trap Hosts

It allows you to add or delete a SNMP trap host for the devices.



Menu Items	Description
Trap Host Name/Address	Enter the hostname or IP address of the trap host to add or delete.
Community String	Enter the community string of the trap host.
Action (add/delete)	Select the action from the dropdown list.

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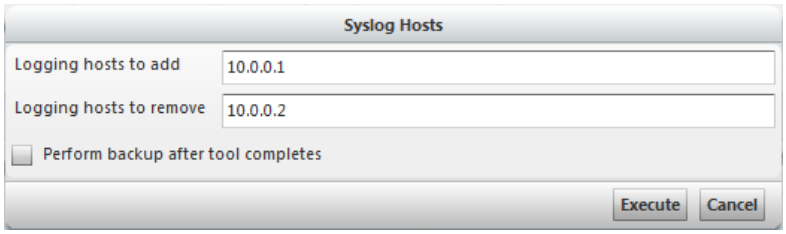
3.6.9 Syslog Hosts

It allows you to add or delete a syslog host of the devices.



Menu Items	Description
Logging hosts to add	Enter IP address of the syslog host to add.
Logging hosts to remove	Enter IP address of the syslog host to delete.

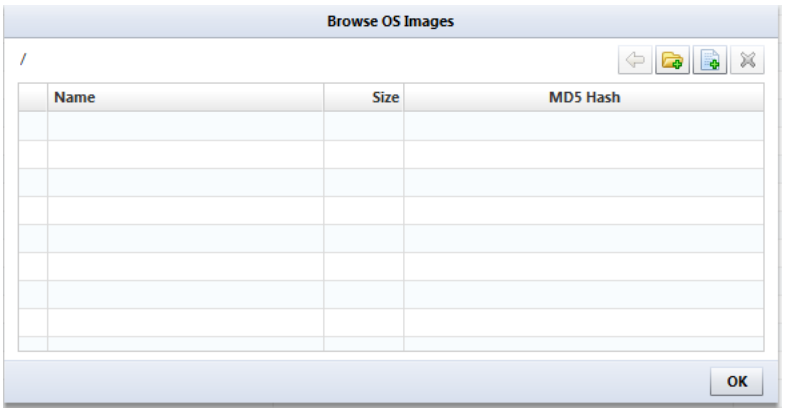
3.6.10 IOS Software Distribution

netLD is able to distribute IOS software to the devices through the remote network. IOS images should be saved before using the tool. To save the image, see Sec. 3.6.13. †[9]

3.6.11 Manage OS Images

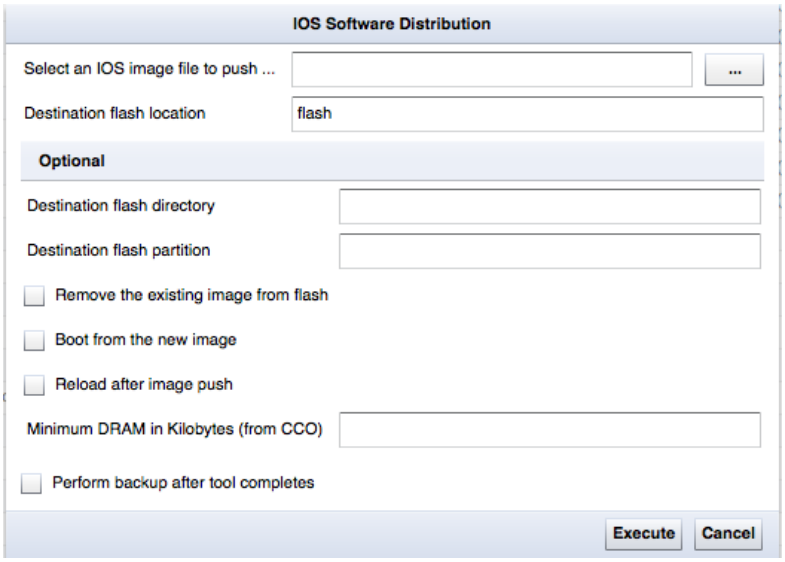
Specify the directory on the server's file system and search for OS image files in that directory. The images found in this feature are later available in IOS Software Distribution(Sec. 3.6.10) and NEC WA Software Distribution(Sec. 3.6.12).

Click on to add an IOS image files.



[9]IOS Software Distribution tool is not available for devices that boot from the flash memory e.g. Cisco 1600/Cisco 2500/Cisco AS5200.

Figure 3.6.1: IOS Software distribution



Menu Items	Description
Select an IOS image file to push...	Click on the ... button on the right and select the image in a *Browse OS image* dialog.
Destination flash location	Specify the name of the drive (e.g. `flash`, `usbflash0`, `nvram`) on the device.
Destination flash directory	Enter the directory on the drive where the flash image is saved. If the directory does not exist, it will be created.
Destination flash partition	Enter the drive partition. If the partition does not exist, the distribution fails.
Remove the existing image from flash	–
Boot from the new image	–
Reload after image push	Reload the new image after pushing the image.
Minimum DRAM in Kilobytes (from CCO)	Enter minimum DRAM size (the information is available at Cisco.com.) This is an optional feature to check if the device has enough space for the new image.
Perform backup after tool completes	–

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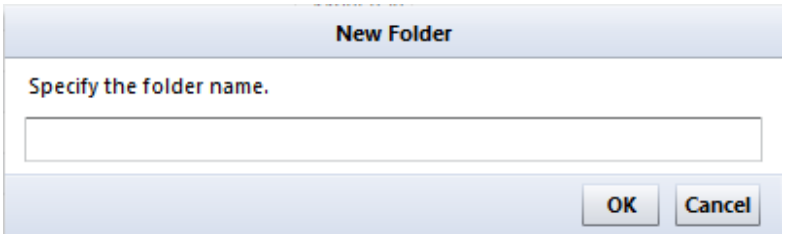
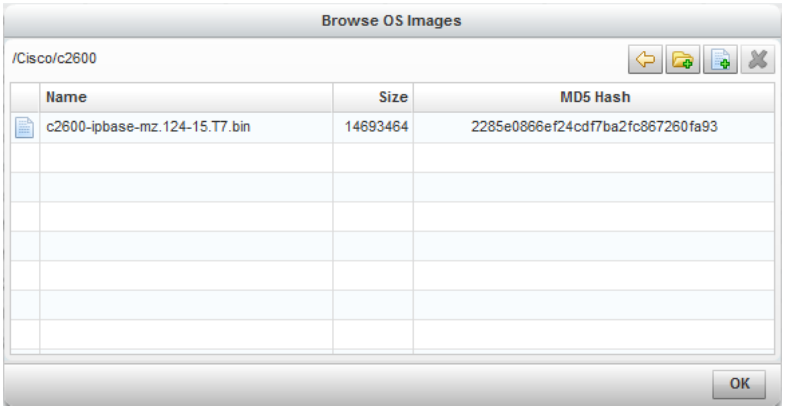
You can add some directories. This can be achieved by click on the button in the previous figure.



After the image is successfully added to the list, click on the OK button to finish.



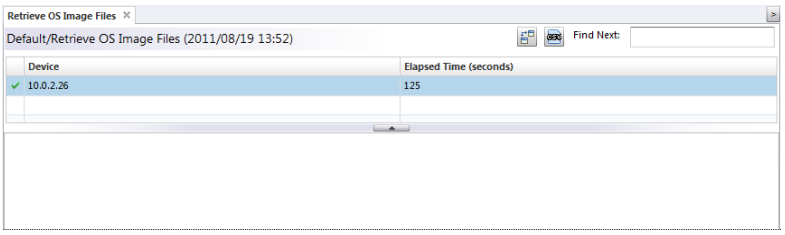
†[10]

3.6.12 NEC WA Software Distribution

Similar to IOS distribution, netLD is also able to distribute NEC WA software to the devices through the remote network. The images should be saved before using the tool. To save the image, see Sec. 3.6.13.

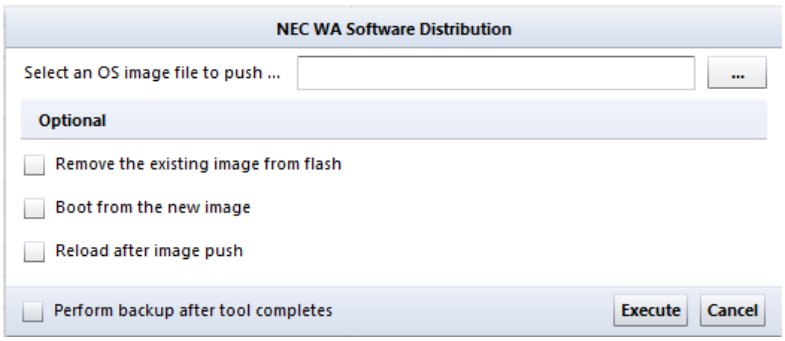
3.6.13 Retrieve OS Image Files

This feature retrieves an IOS image file from the devices and store it internally. Those images can be used for IOS Software Distribution (Sec. 3.6.10) and NEC WA Software Distribution (Sec. 3.6.12).



[10]The time required to add an image varies. If you wait for a while and the image is not displayed yet, retry to add the file again.

Figure 3.6.2: NEC WA Software distribution



Menu Items	Description
Select an IOS image file to push...	Click on the ... button on the right and select the image in a *Browse OS image* dialog.
Remove the existing image from flash	Enable it to remove the existing image from flash.
Boot from the new image	Enable it to boot from the new image.
Reload after image push	Enable it to reload the new image after pushing the image.
Perform Backup after tool completes	–

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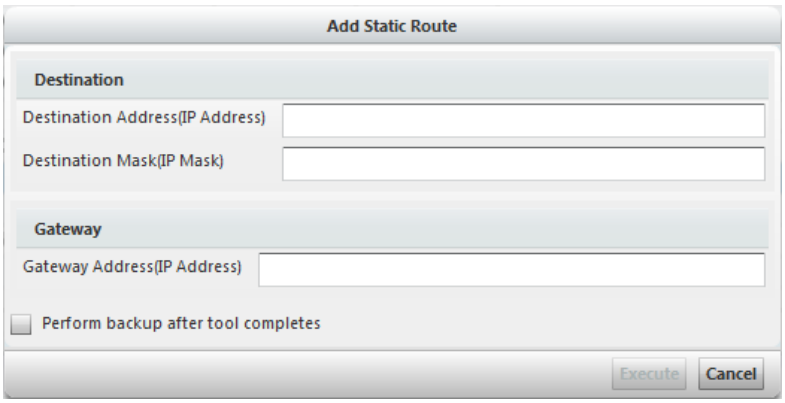
3.6.14 Add Static Route

Here, you can add new static routes for the devices. Enter required information to add a static route and click on the *Execute* button.

Add Static Route window.

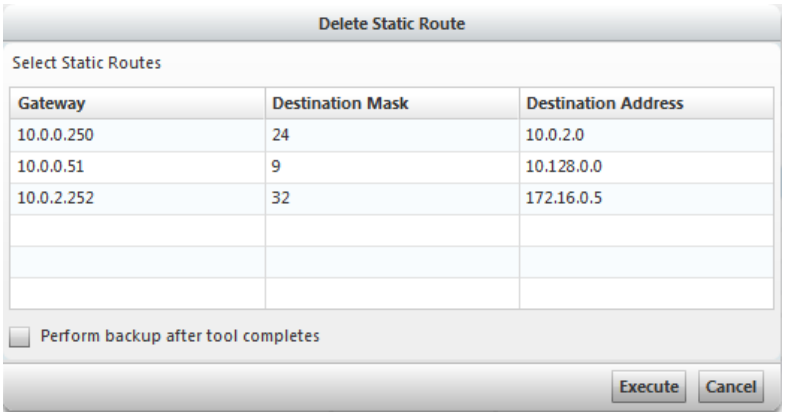


Menu Items	Description
Destination Address (IP Address)	Enter the destination IP address.
Destination Mask (IP Mask)	Enter the destination subnet mask.
Gateway Address (IP Address)	Enter the destination gateway address.

3.6.15 Delete Static Route

Here, you can delete static routes for the devices. Select the static routes to delete and click on the *Execute* button.

Delete Static Route window.

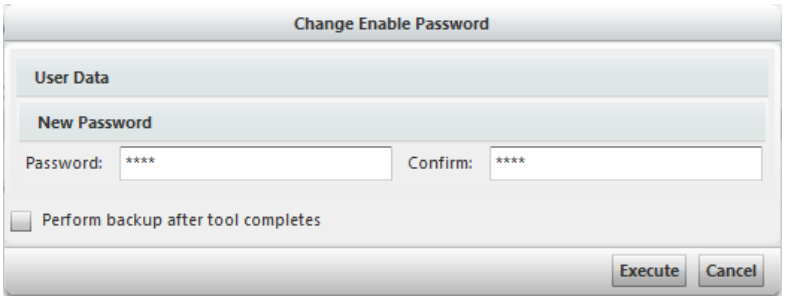


3.6.16 Users

It changes the user account and password on the devices.

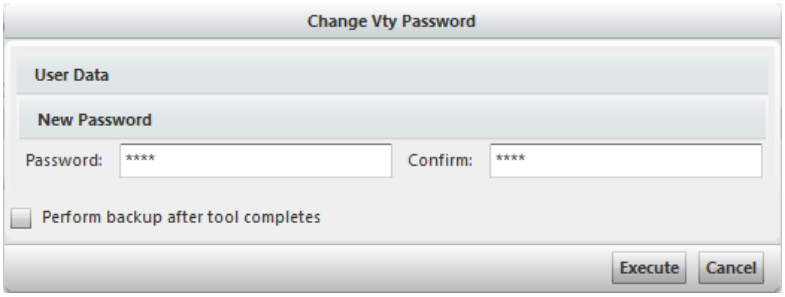
Change Enable Password

It sets an *enable password* or an *enable secret password* for the devices. If both passwords are configured on the devices, it overwrites the enable secret password only.



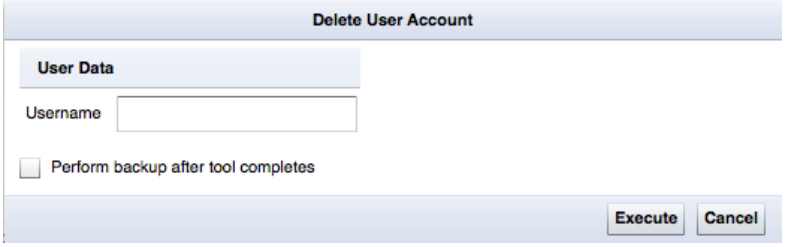
Change VTY Password

It changes the VTY password of the devices.



Delete User Account

It deletes the existing user account on the device.



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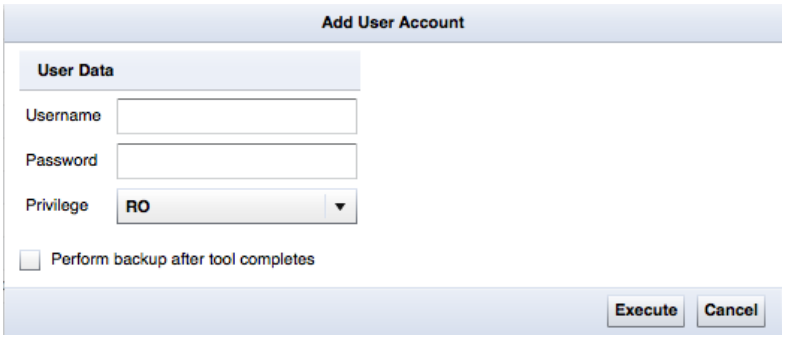
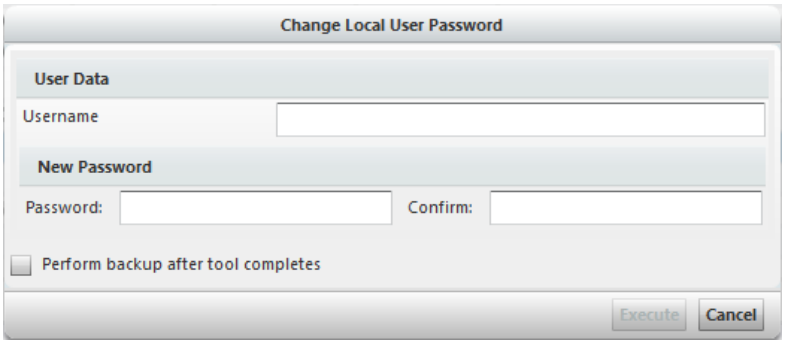
Add User Account

It adds a user account on the device.



Change Local User Password

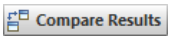
It changes the local passwords for the username configured on the devices.



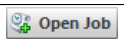
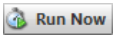
3.7 Job Management

In *Jobs Tab*, you can create, manage, edit and run the *jobs*. *Jobs* are the tasks that are scheduled to run automatically and periodically. A *Trigger* for a schedule is a specifier of the periodical cycles, e.g. *once in a day at noon*, *every five minutes*, *every first Monday in a month* and so on. Several triggers can be added to one task, and the triggers define how often the tasks are executed.

Jobs Tab consists of two subtabs, *Job History* and *Job Management*. In *Job History* subtab, you can see the past results of the jobs, including the ones that are run automatically. Following buttons are available in the *Job History* subtab.

Menu Items	Description
	Opens the results of the selected job.
	Compares the results of the same type of selected jobs.
	Cancel the selected job if the job is running.

Job Management subtab is a place you can actually create, manage, edit and run the jobs. Jobs can be modified by double-clicking on it. Also, several buttons are provided:

Menu Items	Description
	Open the job in the status pane. This has essentially the same effect as double-clicking on the job.
	Delete the selected jobs.
	Rename a job.
	Execute the selected jobs immediately.
	Create a new job. A dropdown list will show up, and you can further choose which kind of job to create (Backup, Smart Change, Discovery, Neighbor, Report or Tool).
	Add an opt-out filter that can be used while scheduling a job, called Scheduler Filter. See Sec. 5.1.2 for details.

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3.7.1 Creating a New Job

Jobs can be created in *New Job* submenu. The basic process of creating a job is shared in all kind of jobs. Whenever you make a job, you are expected to:

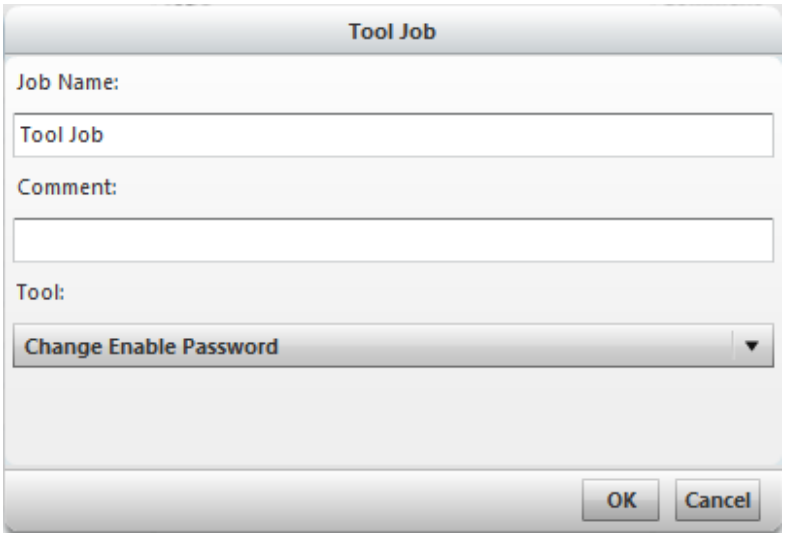
1. Set a job name and select a feature,
2. enter the required parameters,
3. select the target devices, and
4. set the triggers (schedule) of the job.

We provide a screen-by-screen instruction now. Click on the *New Job* → *Tool* for example.

Set a Job Name and Select a Feature

First, enter the name and the comment in the fields and select the tool type from the dropdown list. Almost all tools in *Devices Tab* → *tools menu* → *Change* are available. Now we choose *Change Enable Password* for example.

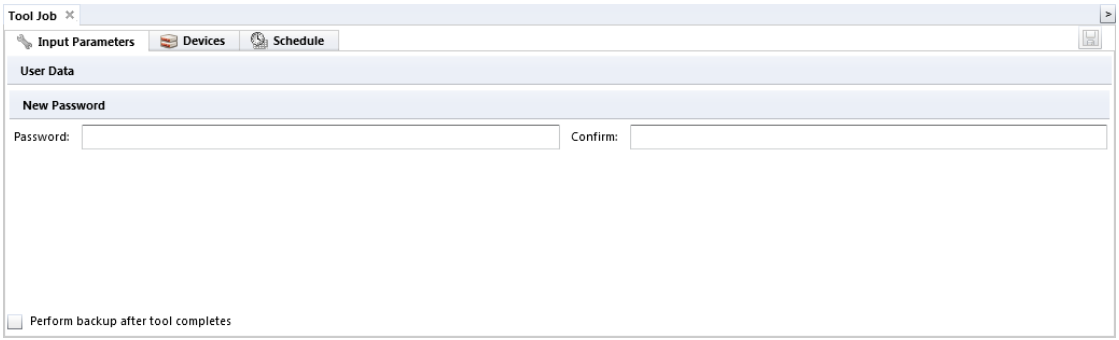
Process 1.



Enter the Required Parameters

Next, enter the required parameters in Input Parameters tab. Since we activated the Change Enable Password tool in the previous step, parameters fields for new password and confirmation are displayed.

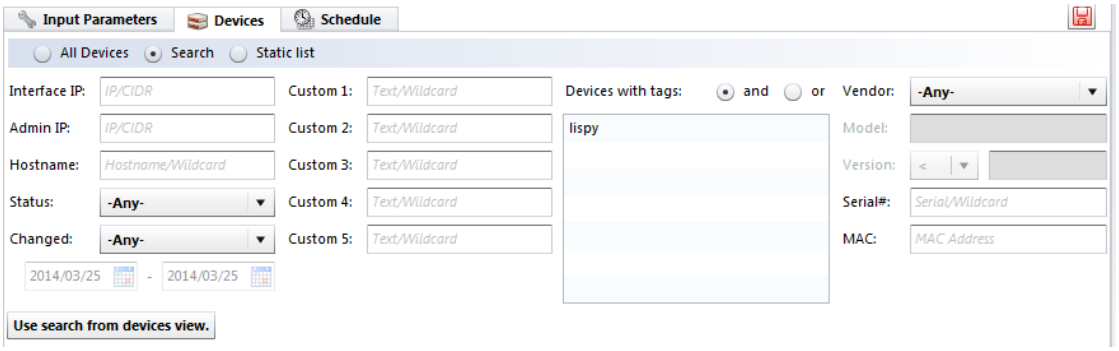
Process 2.



Select the Target Devices

Next, we proceed to the Process 3. Currently, you are supposed to be opening a *Jobs tab* in the *main* pane and a new job in the *status* pane, which further opens *Input Parameters* subtab. Now, open the *Devices* subtab in the lower pane. A view similar to the *advanced search* pane in the device tab should be displayed in the status pane. You would also notice that there is an additional radio button, saying *All Devices, Search, Static List.*

In Process 3. You would use this default *Search* option more often. However, for the sake of beginners, we choose *Static List* in this instruction. Then the screen should look like the following:



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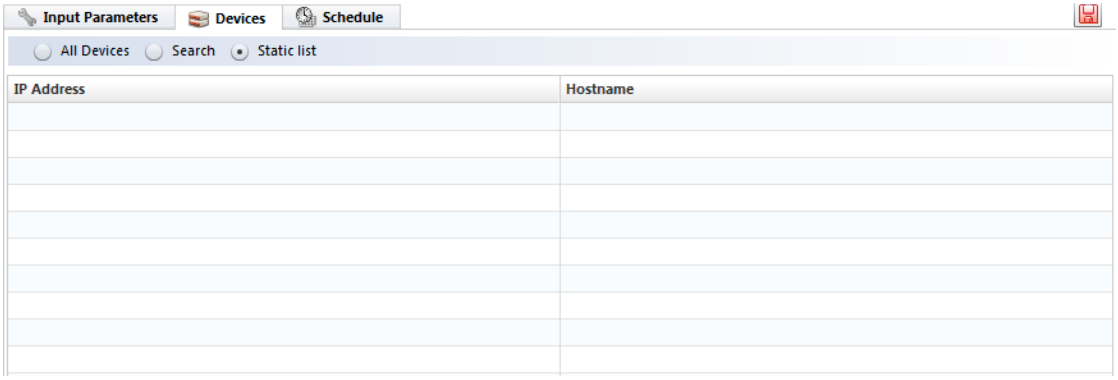
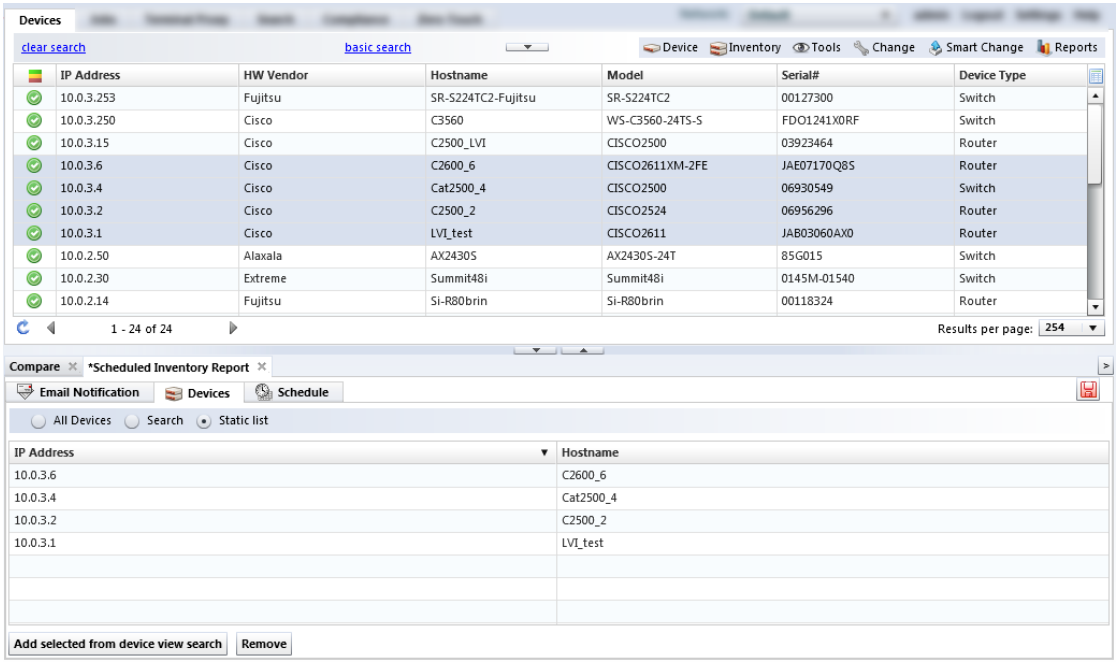
This is the *Static List* option in Process 3.

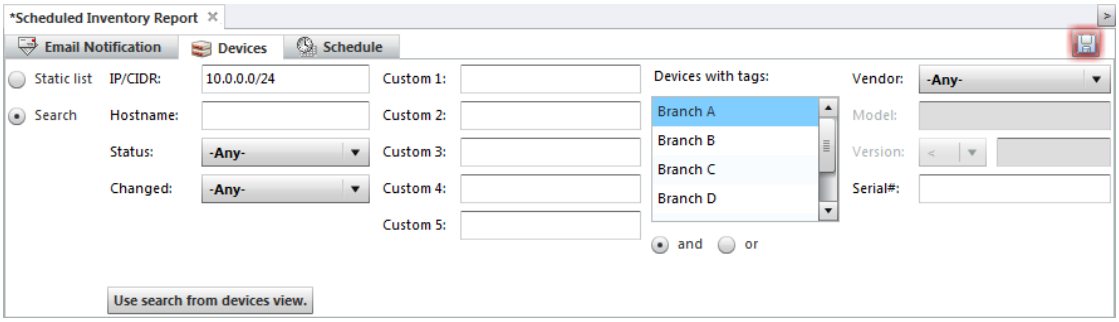


Now, an important technique is introduced here. It might seem a bit tricky, but once you get accustomed to it, you would soon feel it very comfortable. We call it a *tab-switching technique*, which effectively utilize the nature of the *two* panes available in the netLD interface, namely *main* and *status* pane.

You can move the upper *main* pane to the Devices Tab. Now you can choose the devices that a job is run. Select the devices in the *Device View* as usual and click on the *Add selected from Device View search* button in the lower *status pane*.



Or select the radio button *Search* and use the Search feature in the status pane. The queries in the *Device View* (in main pane) can be copied into the status pane by *Use search from Device View*.

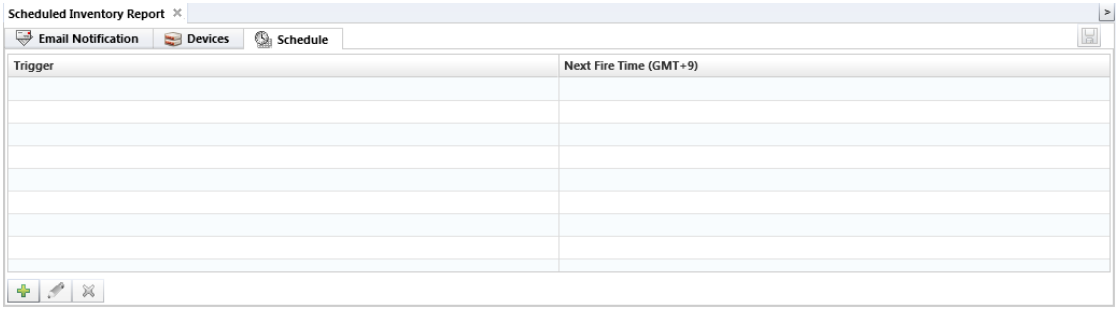


†[11]

Adding a Trigger

Finally, we add the triggers (Process 4).

Move to *Schedule* subtab in the status pane. Click on the bottom-left to add a new trigger.



[11] If you use *Search* option while adding the devices to the job, the query is run *each time* the job is run, and the search results changes depending on the inventory **at the time of the job to run**.

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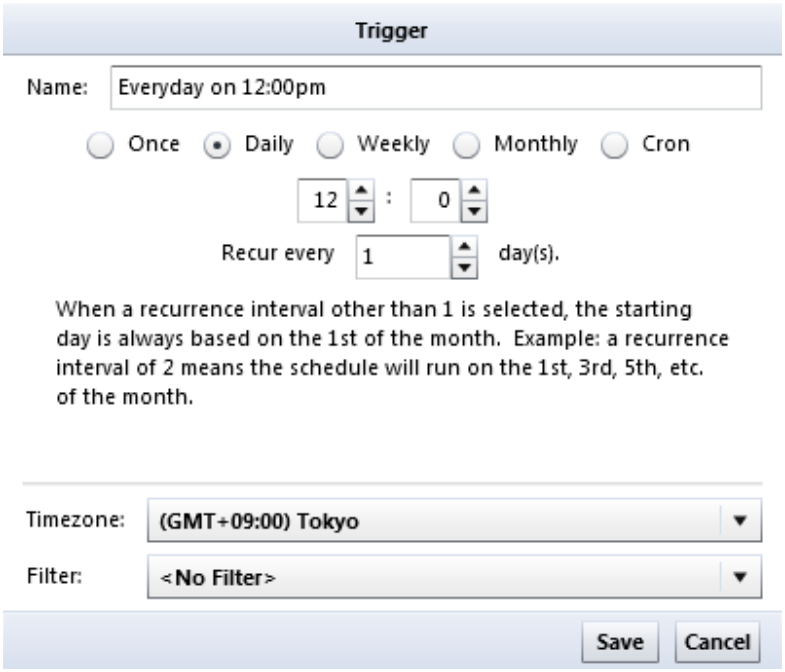
Set a trigger with the date and repetition cycle. Click on the Save button after all the required information is set.



Name Specify the name of the trigger.

Time Specify the time and date to perform the job.

Schedule Select one of the following scheduling types.

Once the job is scheduled just once.

Daily the job is scheduled to run on every

$$1 + n \times k$$

th day e.g.

$$n = 2$$

, the job is run on 1st, 3rd, 5th, ... 31st.

Weekly execute the job every day of the week specified.

Monthly run the job every $1 + n \times k$ months. Many options are available.

Cron to specify the job's schedule with a cron expression.

- Refer to the Sec. 8.1 for cron configuration.

Timezone Specify the time zone.

Filter Select an opt-out filter applied to the schedule. The job is not executed on the timing specified by this filter. For further detail, see Sec. 5.1.2.

Do not forget clicking on the button to save the job. It is in the upper-right corner of the status pane. If the button is active (red), some changes are not saved yet.

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3.7.2 Status Indicators in Job History Subtab

Here is the list of the status indicators.

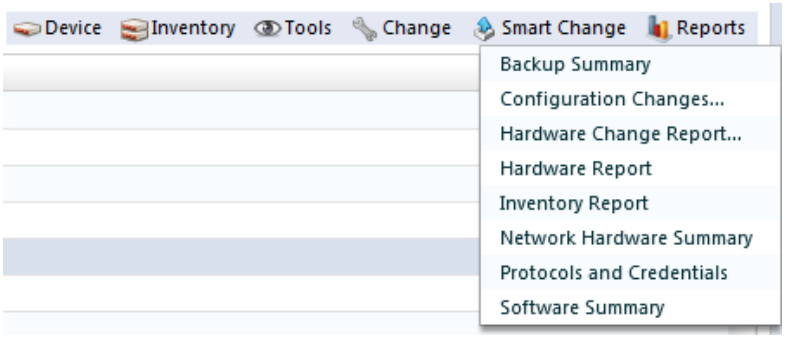
Menu Items	Description
	netLD performed the job on all devices successfully.
	netLD performed the job, but it failed on some devices.
	netLD failed to perform the job on all devices.

The Data retention policy of the job history is described in Sec. 5.2.1.

3.8 Report

Net LineDancer provides several types of useful and informative reports on the devices. You can run it from the menu at any time, and it can be scheduled to run automatically.

Figure 3.8.1: The Report tools are available under *Reports* submenu.



We provides the following eight types of reports.

Inventory Report shows the hostname, IP address, model, OS version and serial number of the devices, as well as the date the last backup was performed on the device.

Inventory Report
7/15/14 7:38 PM

netLD Enterprise

Hostname	IP Address	Model	OS Version	Serial Number	Last Backup
Alaxala					
AX2430S	10.0.2.50	AX2430S-24T	10.4	85G015	07/15/2014 3:09 PM
Apresia					
Apresia_SW	10.0.2.5	Apresia3424GT-SS	7.22.01		07/15/2014 3:09 PM
Cisco					
2500	10.0.3.4	CISCO2500	12.1(9)	06930549	07/15/2014 3:09 PM
892J_TEST	192.168.0.111	CISCO892-K9	15.1(4)M1	FHK134570SY	07/08/2014 2:51 PM
2960Cisco	10.0.3.248	WS-C2960-24TT-L	12.2(46)SE	FOC1117Z9D0	07/15/2014 3:09 PM

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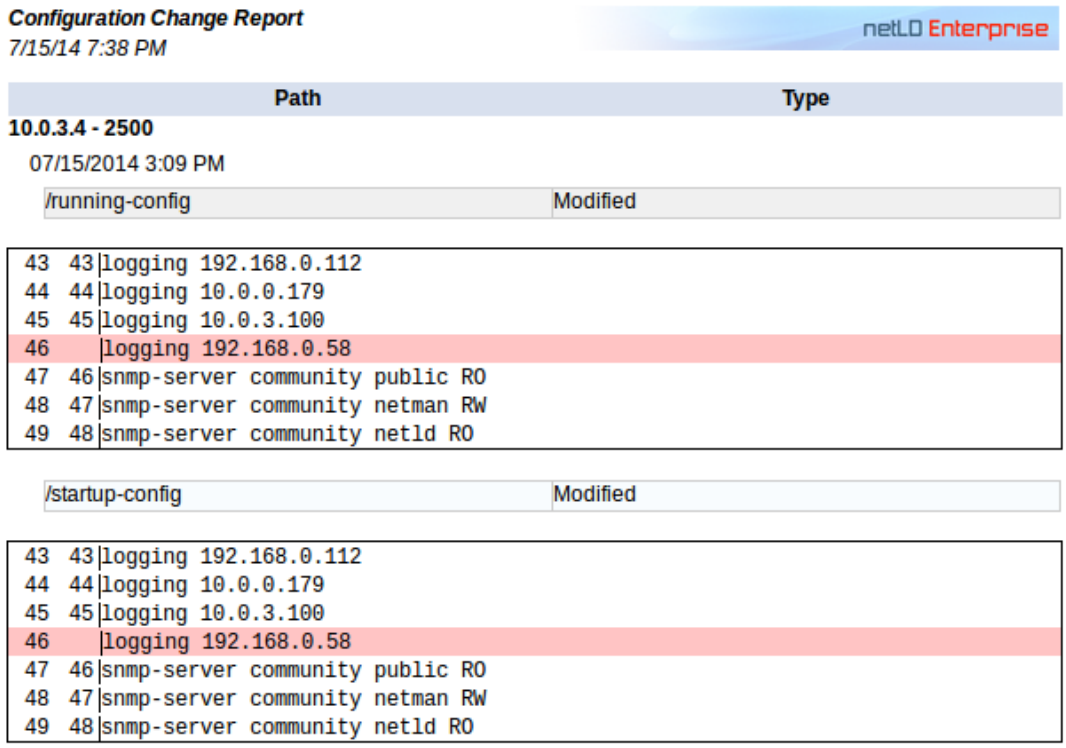
Configuration Change Report shows change history and details of configurations changed during specified period for the devices.



Configuration Change Report
7/15/14 7:38 PM

netLD Enterprise

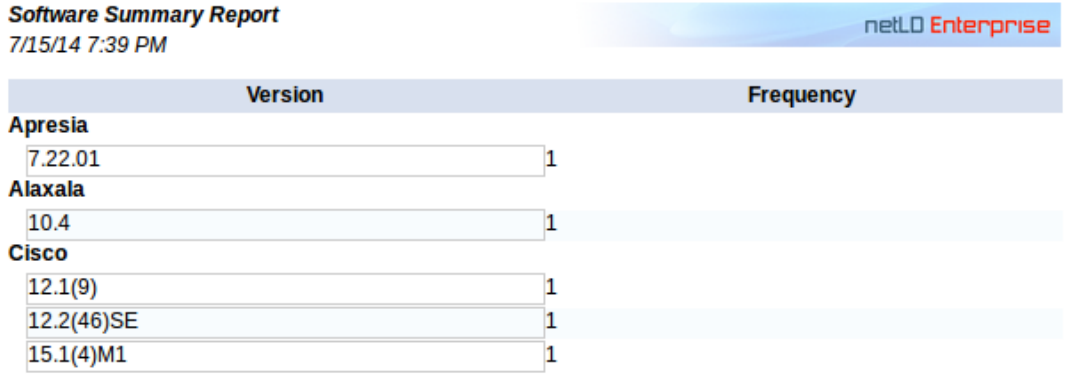
Path	Type
10.0.3.4 - 2500	
07/15/2014 3:09 PM	
/running-config	Modified

```
43  43 logging 192.168.0.112
44  44 logging 10.0.0.179
45  45 logging 10.0.3.100
46     logging 192.168.0.58
47  46 snmp-server community public RO
48  47 snmp-server community netman RW
49  48 snmp-server community netld RO
```

/startup-config	Modified

```
43  43 logging 192.168.0.112
44  44 logging 10.0.0.179
45  45 logging 10.0.3.100
46     logging 192.168.0.58
47  46 snmp-server community public RO
48  47 snmp-server community netman RW
49  48 snmp-server community netld RO
```

Software Summary shows OS information of all devices in Device View.

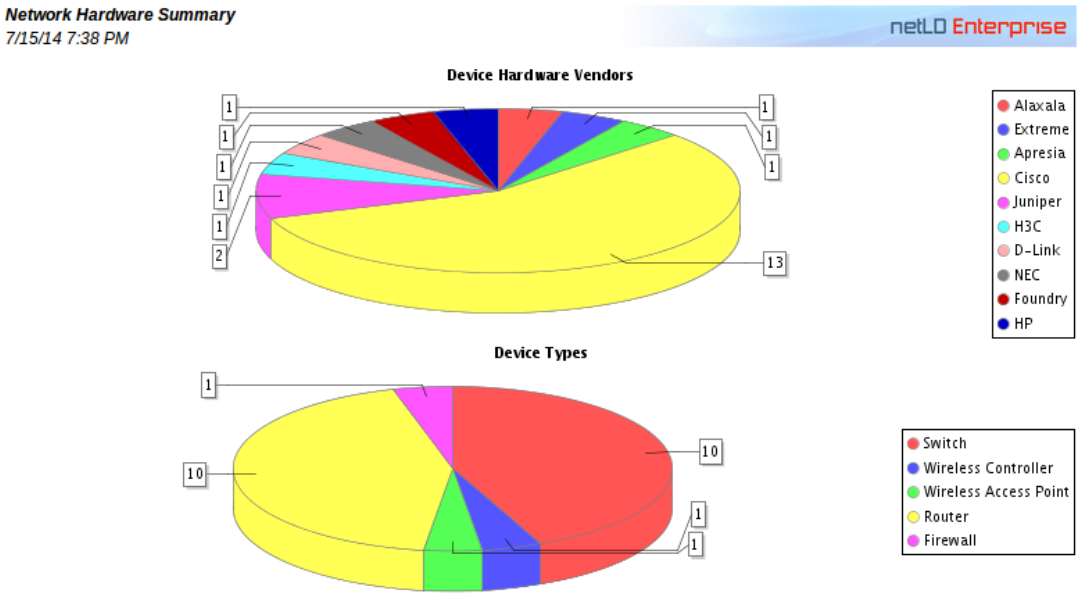


Software Summary Report
7/15/14 7:39 PM

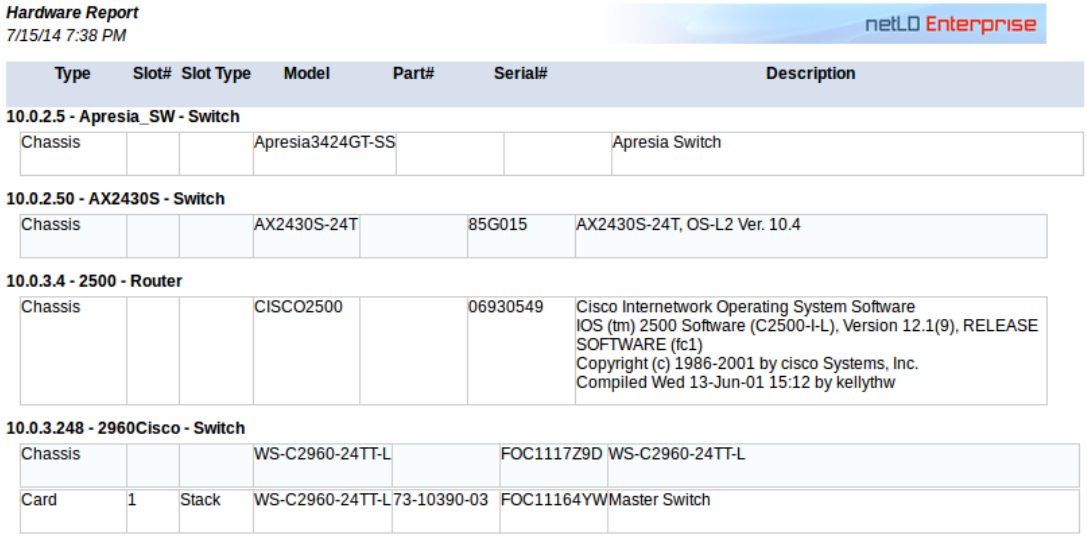
netLD Enterprise

Version	Frequency
Apresia	
7.22.01	1
Alaxala	
10.4	1
Cisco	
12.1(9)	1
12.2(46)SE	1
15.1(4)M1	1

Network Hardware Summary shows pie charts where each color corresponds to a device hardware vendor and a device type (firewall, router or switch).



Hardware Report shows the hardware chassis information including type, slot, and serial numbers for the devices.



Hardware Report
7/15/14 7:38 PM

netLD Enterprise

Type	Slot#	Slot Type	Model	Part#	Serial#	Description
10.0.2.5 - Apresia_SW - Switch						
Chassis			Apresia3424GT-SS			Apresia Switch
10.0.2.50 - AX2430S - Switch						
Chassis			AX2430S-24T		85G015	AX2430S-24T, OS-L2 Ver. 10.4
10.0.3.4 - 2500 - Router						
Chassis			CISCO2500		06930549	Cisco Internetwork Operating System Software IOS (tm) 2500 Software (C2500-I-L), Version 12.1(9), RELEASE SOFTWARE (fc1) Copyright (c) 1986-2001 by cisco Systems, Inc. Compiled Wed 13-Jun-01 15:12 by kellythw
10.0.3.248 - 2960Cisco - Switch						
Chassis			WS-C2960-24TT-L		FOC1117Z9D	WS-C2960-24TT-L
Card	1	Stack	WS-C2960-24TT-L	73-10390-03	FOC11164YW	Master Switch

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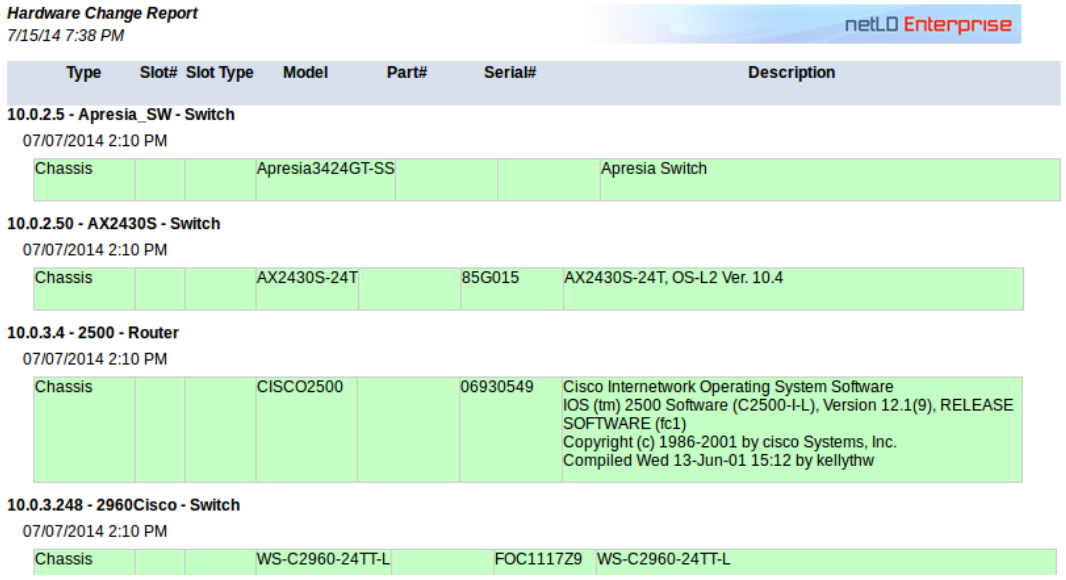
Hardware Change Report shows the change history and the detailed status of hardware, whose configuration is changed during the specified period.

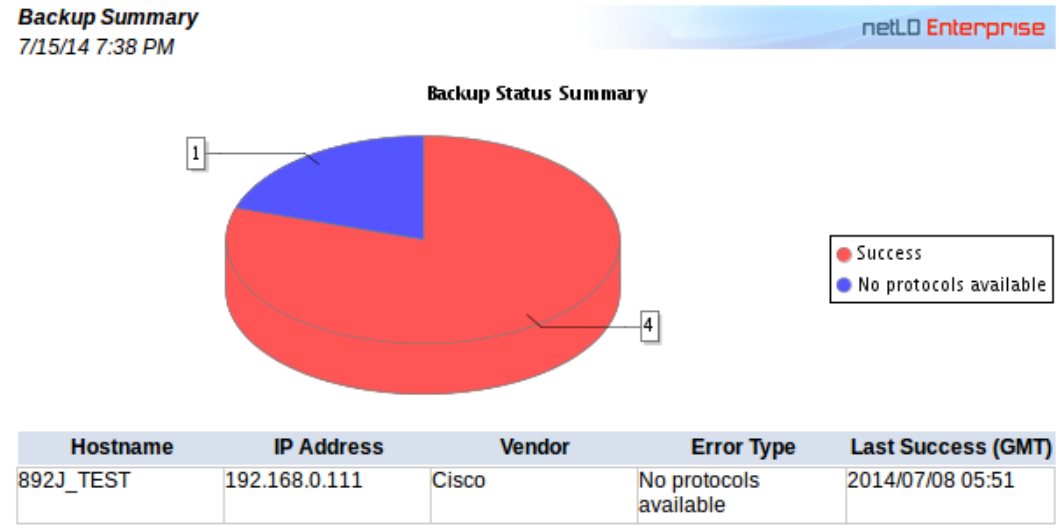


Hardware Change Report
7/15/14 7:38 PM

netLD Enterprise

Type	Slot#	Slot Type	Model	Part#	Serial#	Description
10.0.2.5 - Apresia_SW - Switch						
07/07/2014 2:10 PM						
Chassis			Apresia3424GT-SS			Apresia Switch
10.0.2.50 - AX2430S - Switch						
07/07/2014 2:10 PM						
Chassis			AX2430S-24T		85G015	AX2430S-24T, OS-L2 Ver. 10.4
10.0.3.4 - 2500 - Router						
07/07/2014 2:10 PM						
Chassis			CISCO2500		06930549	Cisco Internetwork Operating System Software IOS (tm) 2500 Software (C2500-I-L), Version 12.1(9), RELEASE SOFTWARE (fc1) Copyright (c) 1986-2001 by cisco Systems, Inc. Compiled Wed 13-Jun-01 15:12 by kellythw
10.0.3.248 - 2960Cisco - Switch						
07/07/2014 2:10 PM						
Chassis			WS-C2960-24TT-L		FOC1117Z9	WS-C2960-24TT-L

Backup Summary shows the backup status summary. Number of successes and failures are summarized into a pie chart. Simple descriptions of failures are listed in the bottom of the report if any.



Backup Summary
7/15/14 7:38 PM

netLD Enterprise

Backup Status Summary

Hostname	IP Address	Vendor	Error Type	Last Success (GMT)
892J_TEST	192.168.0.111	Cisco	No protocols available	2014/07/08 05:51

Protocol and Credentials shows the summaries of protocols and credentials used for all the devices in Device View.

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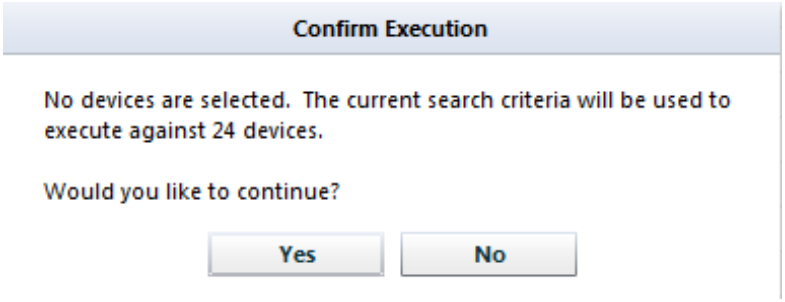
3.8.1 Issuing a Report Manually

You can run the tool whenever you would like to issue a report. There are two kinds of reports, where the former summarizes all devices on the Inventory, while the latter can be issued on the selected device/s.

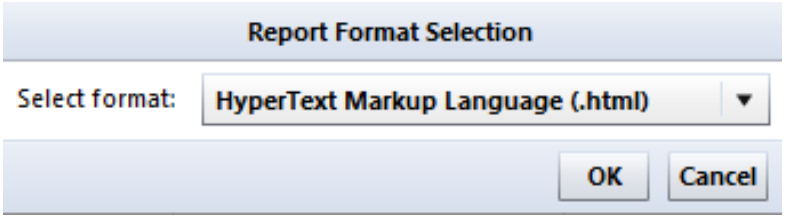
Reports summarized on all devices	Reports that can be issued on each device
Network Hardware Summary	**Inventory Report**
Protocols and Credentials	Configuration Change
	Hardware Report
	Hardware Change Report
	Backup Summary
	Software Summary

Assume we are trying to issue an *Inventory Report*, written in bold in the table above. Select the devices you want to include in the report in *Device View*. If you plan to include all devices, leave everything unselected.

If no devices are selected and the report is designed for summarizing the data on individual device, the following confirmation pops up. Please be careful when the number of devices is large, because building a quite large report may require significant amount of CPU power and the server may hung up.


Confirm Execution
No devices are selected. The current search criteria will be used to execute against 24 devices.
Would you like to continue?
Yes
No

Select a report format to issue and click on the OK button.



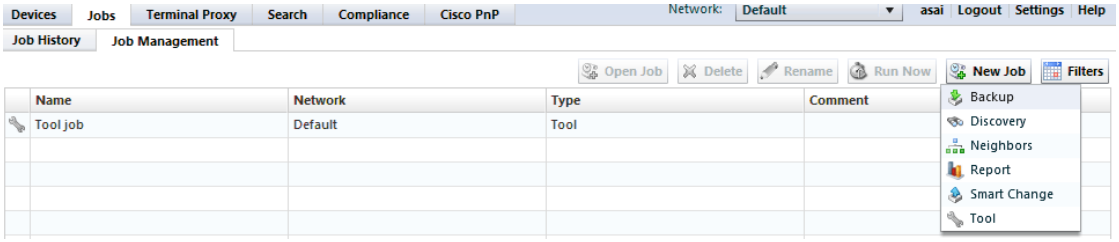
Reporting does not automatically fetch the latest information from the devices. If you need the latest information to be included, perform a backup prior to the execution.

3.8.2 Scheduling the Reports

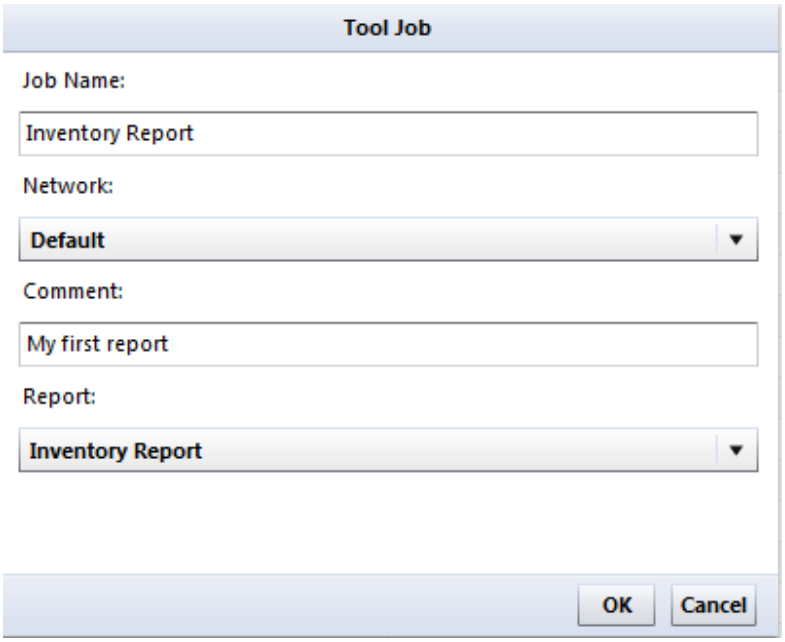
netLD has a feature which schedules a periodical report and e-mails the result to the administrator. The schedule can be configured in *Job tab* → *New Job* → *Report*.

Now, assume we are trying to issue an Inventory Report.

Create a new report.



Enter the name and the comment of the job, then select the desired report type from the dropdown list, now it is Inventory Report. Click on the OK button.



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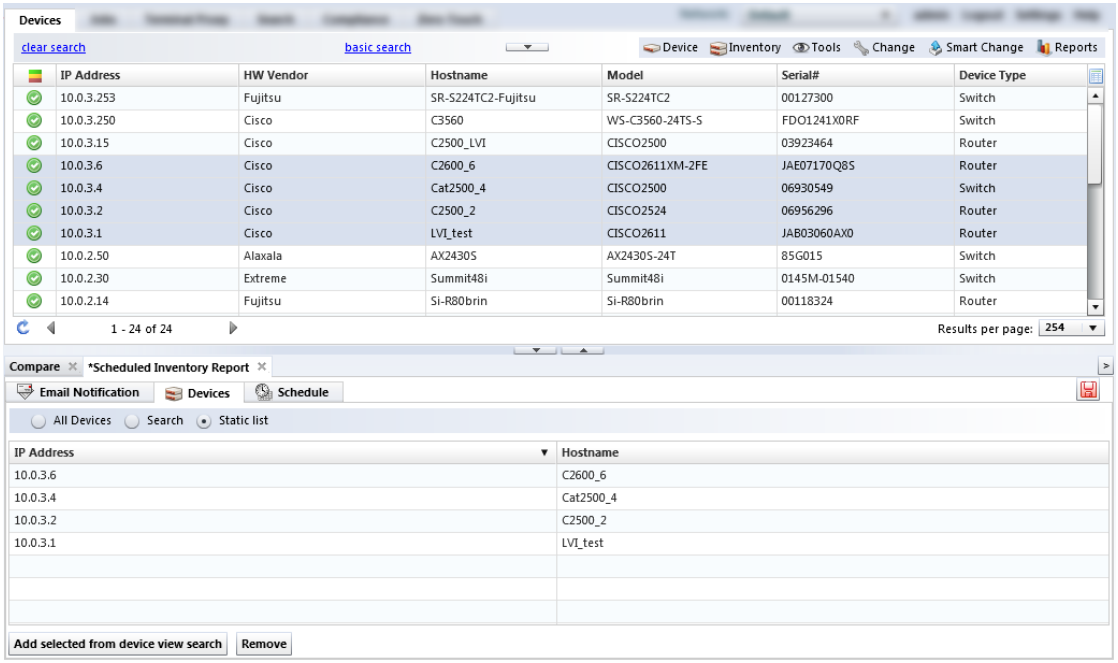
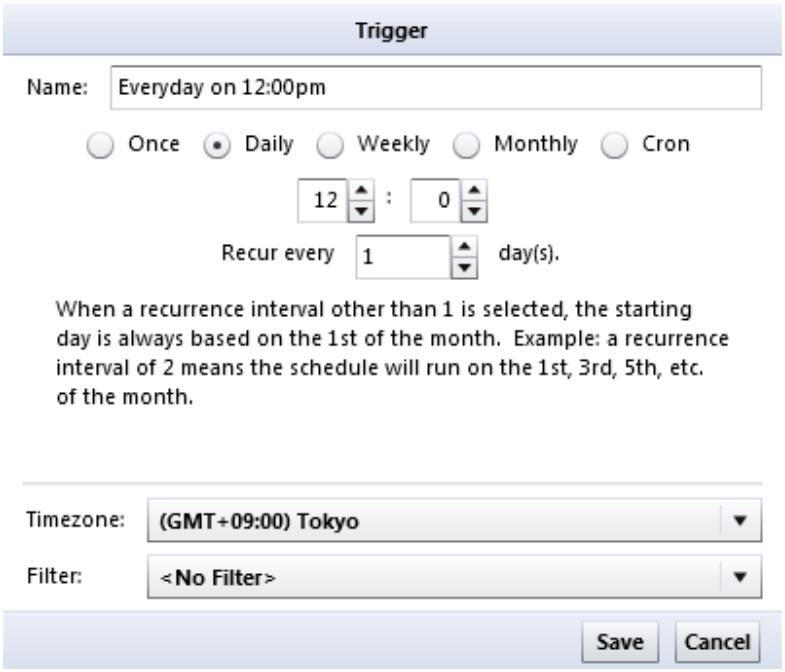
A new tab opens in the status pane. In the Email Notification subtab, select the report format out of HTML and PDF. Enter the recipients in To and Cc fields. You need to setup an SMTP server to make this feature work. See Sec. 5.2.3 for details.

Using the *tab-switching technique* (described previously in Sec. 3.7, p.92), add the devices to the Devices subtab in the status pane.



Set a trigger with the date and repetition cycle to issue the report. Details are described in Sec. 3.7, p.92.



Finally, do not forget to click on the button to save the job.

Once saved, reports are e-mailed automatically. See Sec. 3.7, p.92 for more details about setting the schedules.

3.9 Smart Change

Smart Change feature is similar to Command Runner Tool (Sec. 3.6.1, p.80) but allows for the more flexibility. It instead runs a *command template*, on which you can customize the unique value of each device. For example, the IP Address of the devices in a same network is always unique, and the Command Runner fails in this case. It is because they just run a static sequence of commands and do not send the right command with the right IP address.

In a *command template*, you can enter the required commands in a template and set the right value for the corresponding device. In the following sections, we provide a screen-to-screen instruction for making a command template for the Smart Change jobs. The instruction makes a template for changing the `access-list` of Cisco devices.

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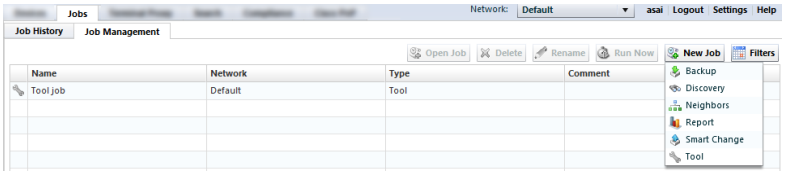
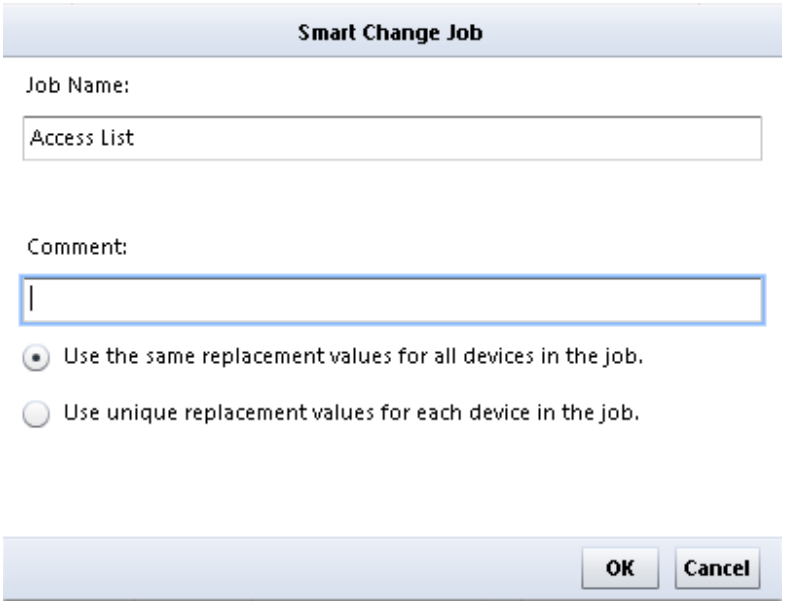
3.9.1 Creating a Smart Change Job

Smart Change jobs are created in *Jobs tab* → *Job Management subtab* → *New Job* → *Smart Change*. Since the major parts of the procedure are common in any job, we do not describe the details not specific to the *Smart Change* feature. (they are already described in Sec. 3.7, p.92.)

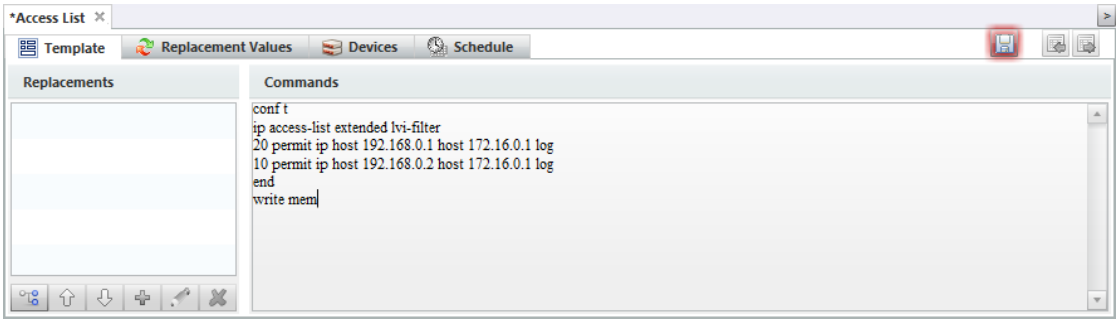
Navigate to the above menu and create a job.



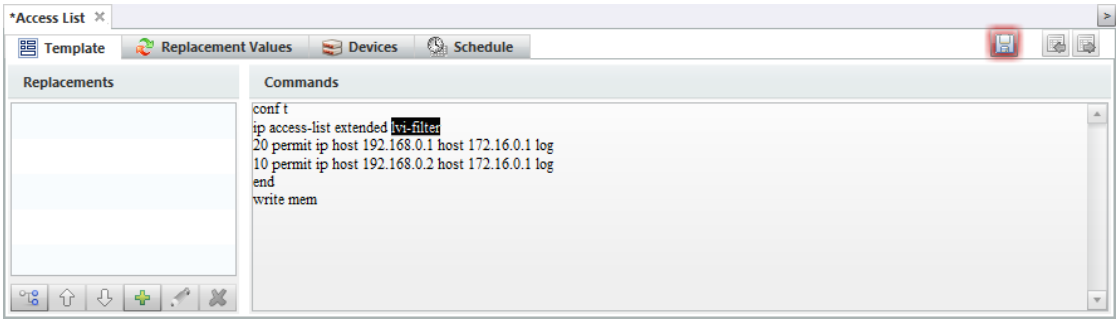
Follow the dialog (process 1). Select either Use the same replacement values for all devices in the job or Use unique replacement values for each device in the job.



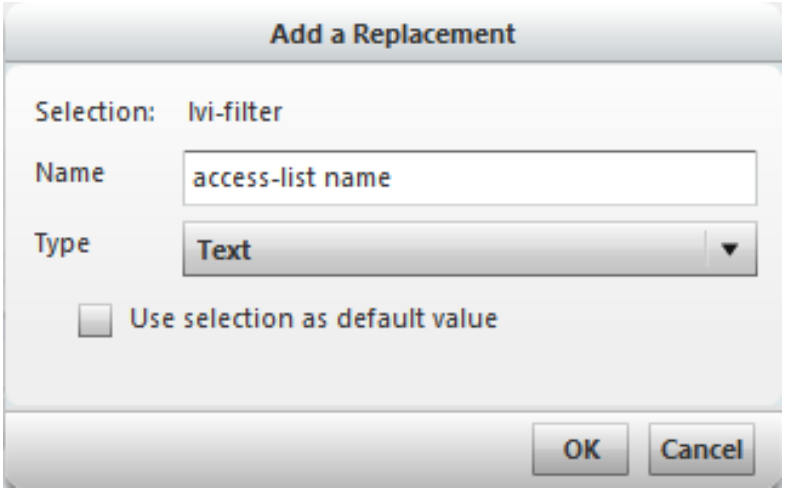
Enter a sequence of ordinary commands in Commands field in the Template subtab. In the figure below, the commands for changing the access-list settings are entered. However, the commands are for one specific device only, since some values (IP address etc.) are specific to one device. We then change these commands into a template.



After entering the commands, select a portion of the text that should be replaced with each device-specific value.



Then click on the to make them into a Replacement. Enter the name of the replacement and select its type. In the example below, we selected "lvi-filter", entered "access-list name" as the name and selected *Text* type from the *Type* dropdown list. Click on the OK button.



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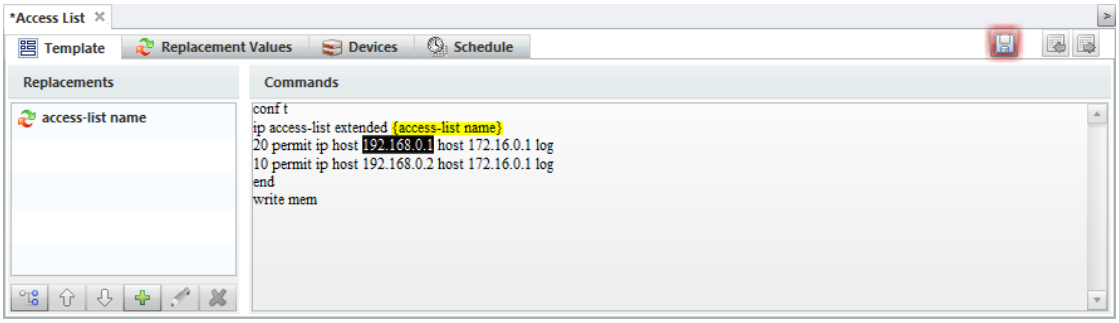
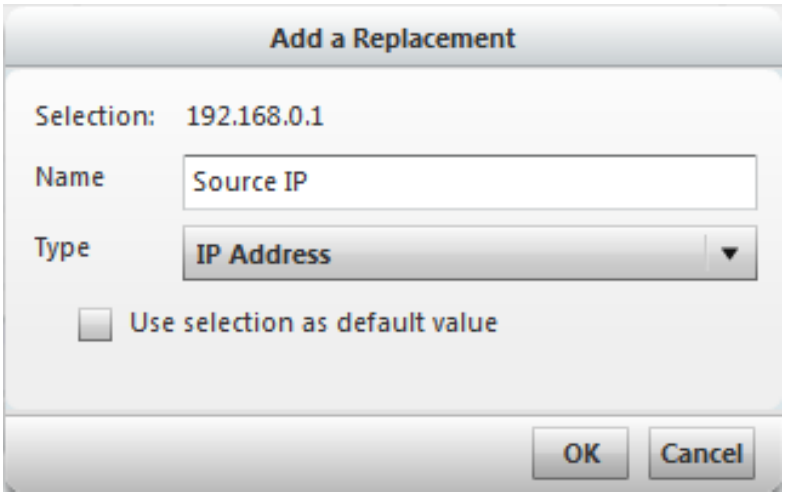
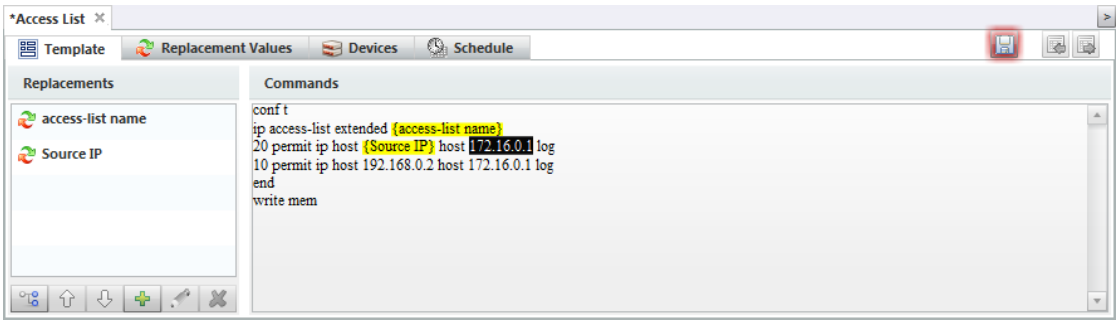
Once the part is set as a replacement, it is highlighted in yellow in the *Commands* field. We next select an IP address to make it into a template.



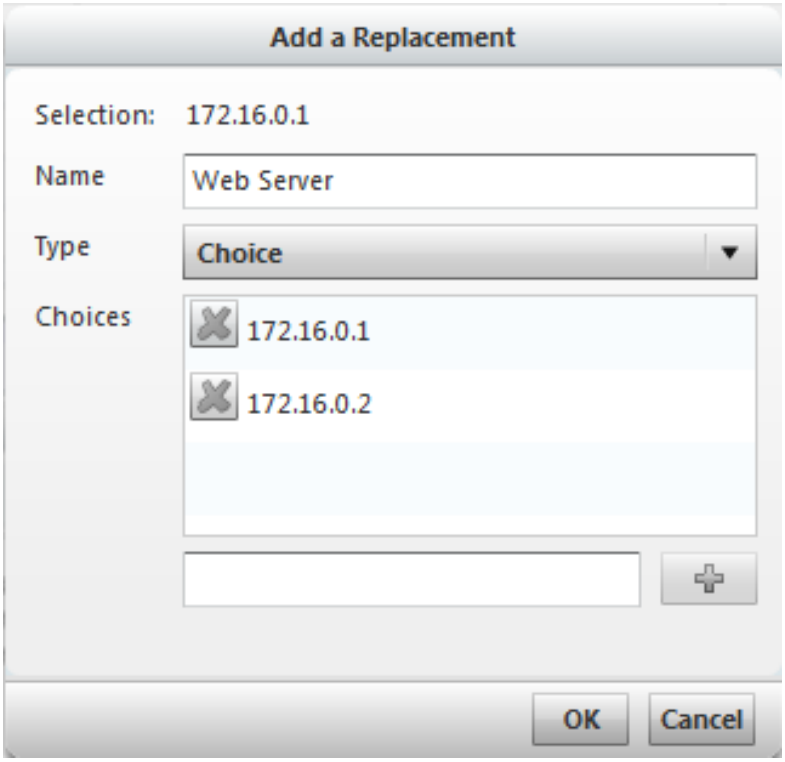
Add a replacement of type IP address with a name "Source IP" in the same manner. The *IP Address* type requires the replacement value (specified later) to be a valid IP address.



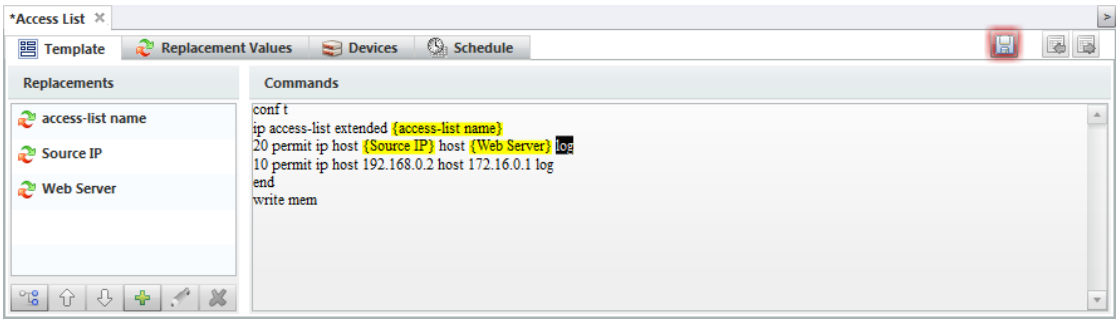
Next we select 172.16.0.1 and add a Choice type replacement with a name "Web Server".



Now the replacement have two possible values, each corresponds to the IP address of the different web server which needs a logging. This can be later selected for each device in Replacement Values section. This feature is convenient when the number of choices are limited.



Adding another conditional type replacement with a name "logging?" for the log entry.



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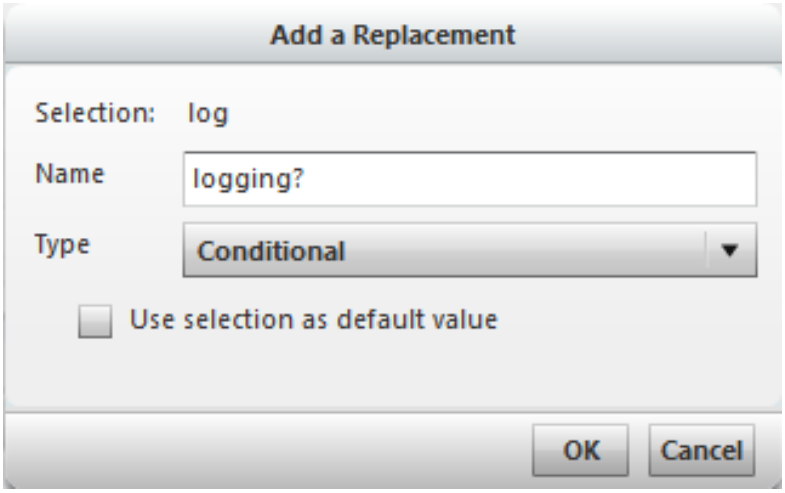
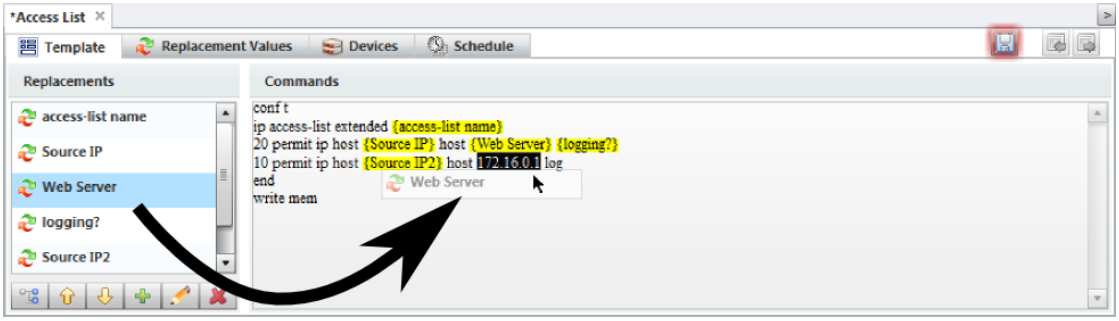
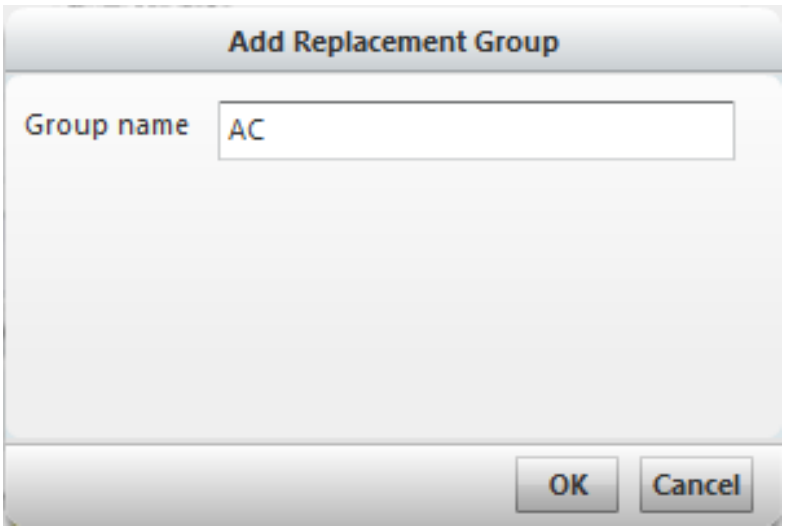
Setting the Conditional Type replacement for the log entry.



When you reuse the same replacement several times in the different parts of the text, select each portion of the text and drag-and-drop the replacements in the list directly onto the Commands field.



If the number of replacements get larger, click on to add a Replacement Group. Add some groups and manage the replacements with the arrow buttons. The navigation would be intuitive enough.



In each dialog, enabling *Use selection as default value* sets the selected value in the configuration text area as the default value of the replacement to be made.

In *Type* dropdown list, you can specify the expected type of the input value. When you make a *Smart Change* template, this will not only ease the tasks to edit each device values, but also ensures that only the correct configurations are sent to the devices. Below, we show the available types of the replacements:

Text Any text.

Hostname Hostname.

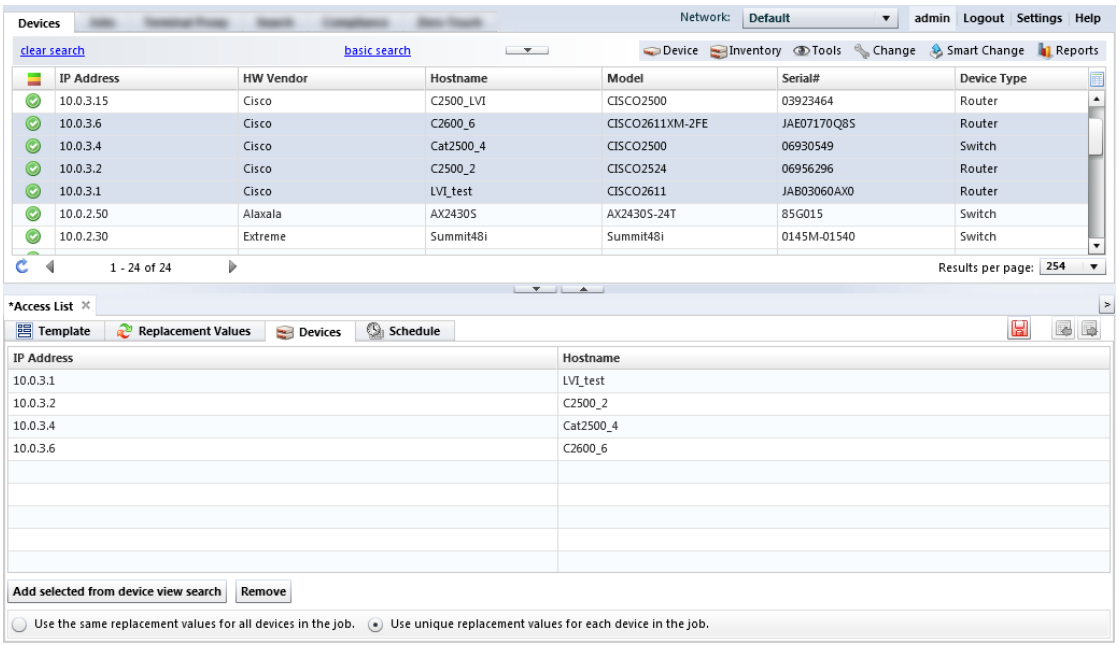
IP address An IP address. It accepts only those texts which conform to the correct IPv4 and IPv6 format.

IP or Hostname IP address *or* hostname.

Choice It makes a dropdown list for selection, which means that only the predefined value is accepted.

Conditional It makes a checkbox to *enable* or *disable* it. If the checkbox is disabled on a device, the replacement is simply an empty string.

Now let's run the Smart Change. In order to add the devices to run the *Smart Change* (process 3 in Sec. 3.7, p.92), we use the *tab-switching technique*, which we do not describe here (refer to Sec. 3.7, p.92).



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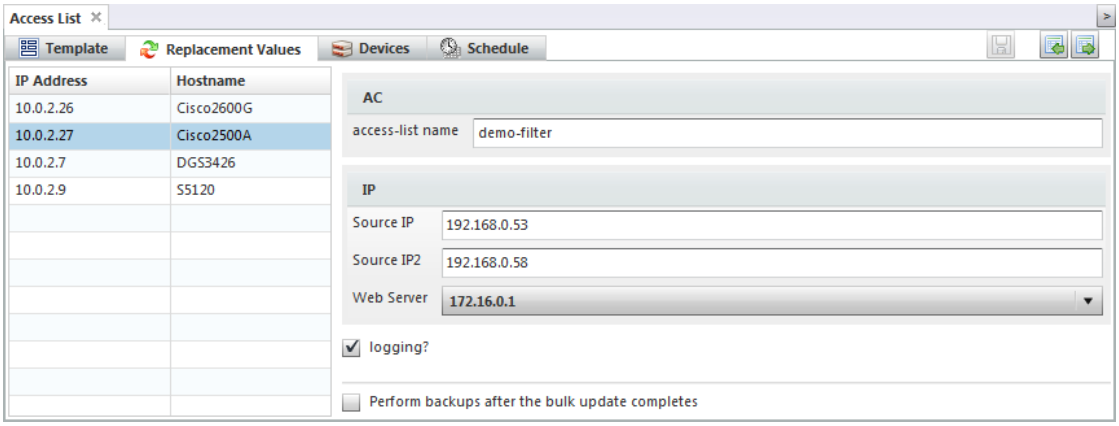
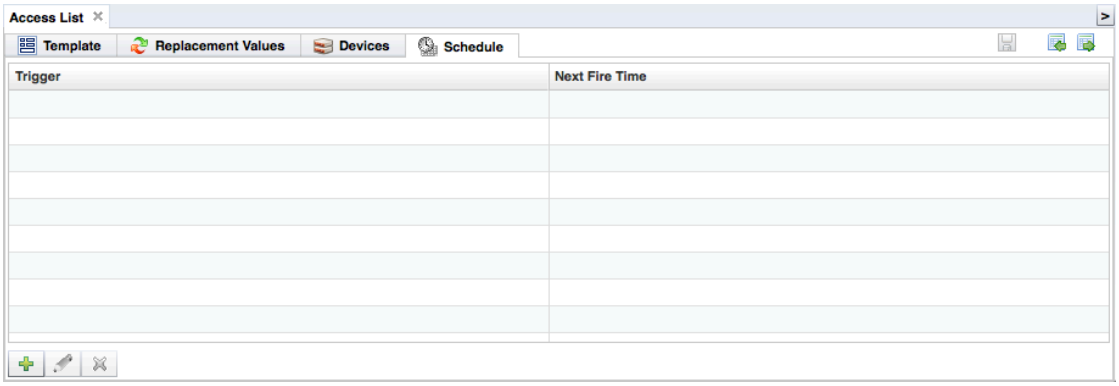
Open the Replacement Values subtab in the status pane and assign the replacement value to each device. The interface is dynamically generated according to which kind of replacements are included in this Smart Change.



†[12]

On Schedule tab, add the trigger by clicking . For more details, see Sec. 3.7.



Finally, do not forget to click on the button to save the job. Now the Smart Change jobs are fully setup. Once you click on the *Jobs tab* → *Run Now* button, netLD runs the job immediately. †[13]

[12] You can import/export the replacement values of IP address for devices in a spreadsheet. Click on the (export) and (import) in the top-right corner of the status pane.

[13] You can also run the job from the Devices Tab. *Tools menu* → *Smart Change* shows the list of Smart Change jobs currently available. Click on the one you would like to execute.

3.10 Compliance

If you configure a *compliance policy*, the administrators are alarmed when some configuration is missing or invalid. It helps you keep the network stable, safe and robust. When a violation has occurred, *Status Display, Pie Charts and Trap Handlers* are the helpful tools. You can analyze the situation and fix the violation quickly.

In order to detect the erroneous and unsafe configurations, you have to define a *Compliance Rule*. A rule can be defined with four types of atomic matching query i.e. *Stop on match, Stop if not match, Violation on match, Violation if not match*. Each query has one matching string and netLD checks if a given configuration matches to the string. Once the query matches / does not match the configuration, above four queries have the following effects:

Violation on match If the query string matches the configuration, then it is a violation.

Violation if not match If the query string does not matches to any lines of the configuration, then it is a violation.

Stop on match If the query string matches the configuration, then the configuration is OK regardless of the rest of the queries.

Stop if not match If the query string does not matches to any lines of the configuration, then it is OK regardless of the rest of the queries.

In other words, "*Violation...*" act as black lists while "*Stop on...*" act as white lists. You can create, modify and delete these rules.

A set of compliance rules forms a *Rule Set*. Rule sets can also be created, modified, copied and deleted. However, you usually do not have to create their own because many useful rules are already provided by default. Entire default rules are listed in *Data* section in Sec. 7.4, p.235.

This is a rules-set provided by default, *IOS Interface Auto-Duplex/Speed*.

- Violation if the interface settings include the followings:
  - no ip address: Stop on match
  - shutdown command: Stop on match
  - duplex auto:Violation if not matched
  - speed auto: Violation if not matched

Additionally, at a higher level, you can define a *Policy*, which is what is actually applied to each device. A policy again consists of many rule sets. However, it also manages which device belongs to that policy, which kind of severity (error, warning or info) should a violation be assigned to, as well as current and historical status of the violations detected on those devices.

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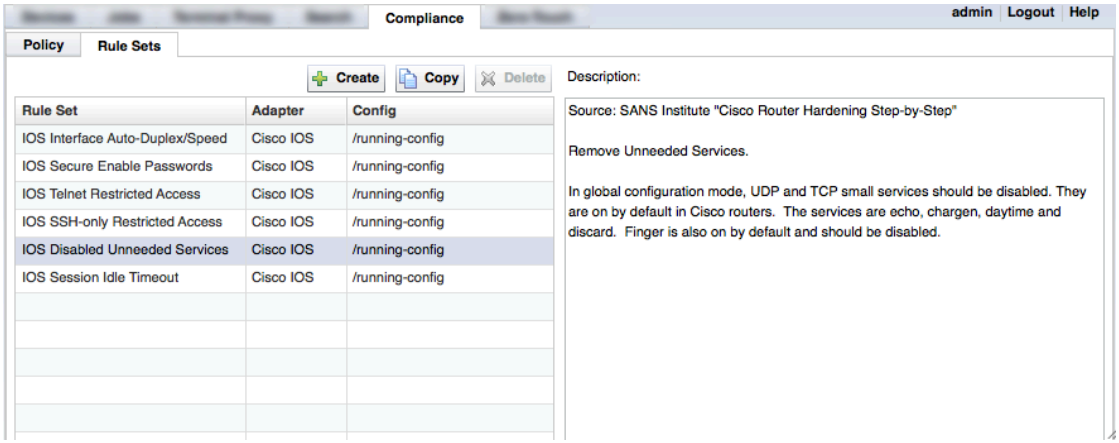
3.10.1 Various Rule-related tabs

To define rules, rule sets and policies, you have to open *Compliance tab* and edit the elements in each tab. Let's review those tabs first.

Rule Sets Subtab

Rule Sets subtab (in main pane): contains some rule sets.

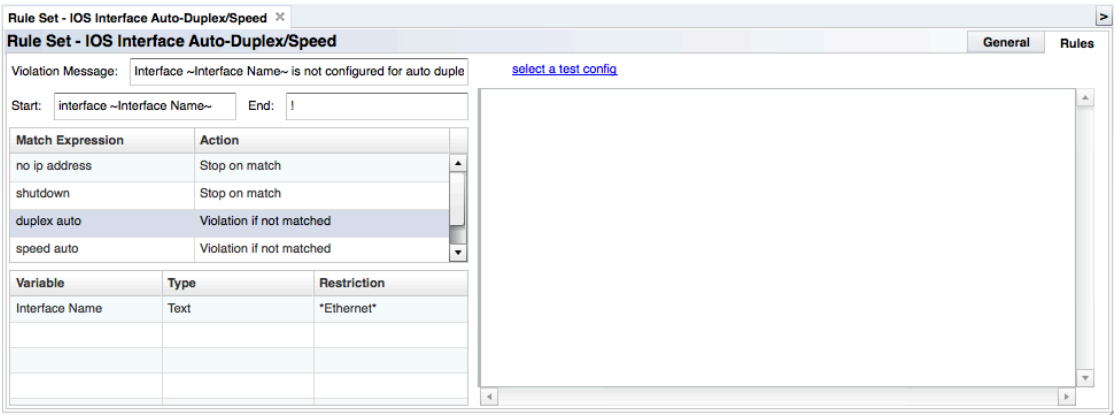
Figure 3.10.1: Rule Sets Subtab



Rules Subtab

double-clicking each Rule Set shows a new tab in the status pane. In the new tab, following subtabs exist:

Figure 3.10.2: Rules subtab (in status pane): contains some rules and provides an interface to modify them.



The items here have the following functions:

Violation Message The warning message to be seen when a violation is detected.

Start / End This is available only when *Apply to blocks* rule is selected. If activated, the beginning and the end of the block are searched with pattern matching, and the violation check is applied only within that block. For example, the expression below limits the violation check only to the specific part of the configuration that matches it. Corresponding code snippets are shown in Fig. 3.10.3.

- Example Start: `line VTY ~variable~` (matches line 6)
- End: `!` (matches line 9)

Match Expression the main query of the match used to determine the violation.

Action One of the following:

- Stop if not matched
- Stop on match
- Violation if not matched
- Violation on match

Variable Variables between tildes are added into the bottom window and any value can be entered. Without any filter, it means "do not care".

Type One of the four possible type of variables:

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- Text
- IP address
- Host name
- Word

Restriction If a violation query matches a line in the configuration, apply a regular expression filter. If a line matches the violation query but the value of the variable does not match the filter, then the violation match is withdrawn.

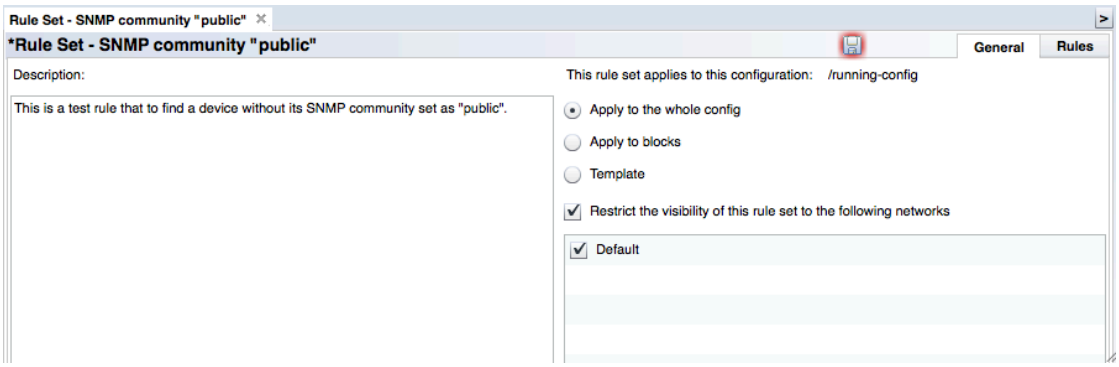
Figure 3.10.3: Example code snippets

```
 1:  banner motd C
 2:  Welcome
 3:  !
 4:  line con 0
 5:  line aux 0
 6:  line vty 0 4   ; *
 7:  password lvi
 8:  login
 9:  !              ; *
10:  !
11:  end
```

General Subtab

General Subtab is meant for writing a documentation for the maintenance. We strongly suggest that you add a documentation to each rules. Suppose one of your administrator quit his job and no one can maintain and understand the purpose of the rules he had written. You would encounter a big problem in this case.

Figure 3.10.4: General tab: you can write a general description and specify some other attributes.


Rule Set - SNMP community "public"
*Rule Set - SNMP community "public"
General
Rules
Description:
This is a test rule that to find a device without its SNMP community set as "public".
This rule set applies to this configuration: /running-config
Apply to the whole config
Apply to blocks
Template
Restrict the visibility of this rule set to the following networks
Default

Items	Description
Description	Giving a neat description is a good practice.
Apply to the whole config	Apply the rules to entire configuration
Apply to blocks	Apply the rules to blocks of configuration divided
Template	Compare the configuration line by line and signals a violation if there is a difference.
Restrict the visibility of this rule set to the following networks	Check this and restrict networks under the rule

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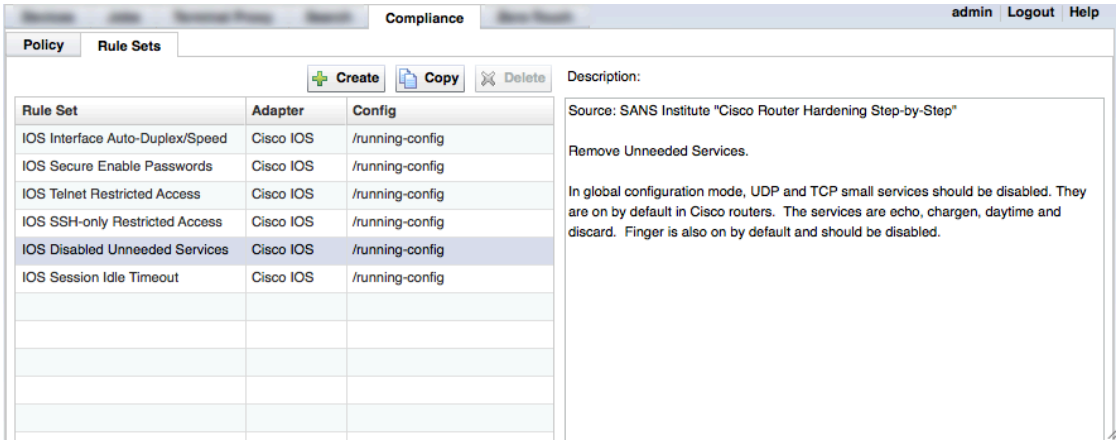
3.10.2 Creating a New Rule

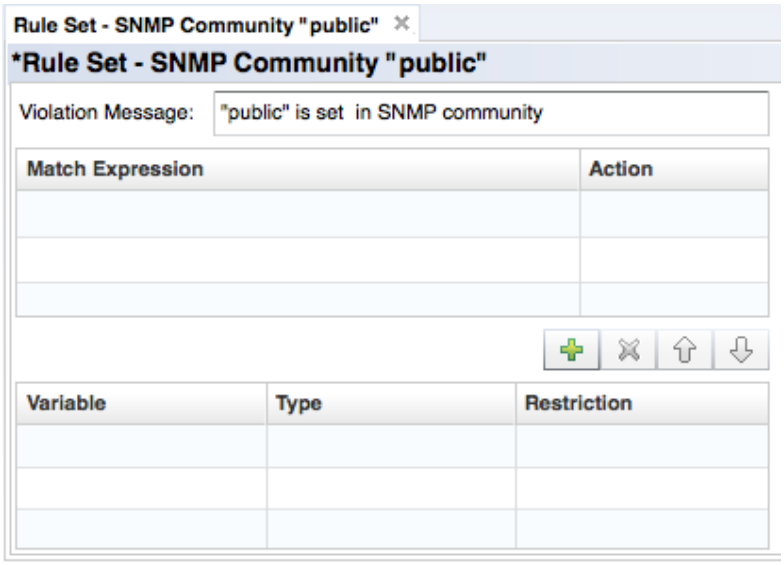
Here, we provide a screen-by-screen instruction. Now let's create a rule here that will generate violation when SNMP community is "public" in Cisco IOS device configurations.

Click on in Compliance → Rule Sets tab.

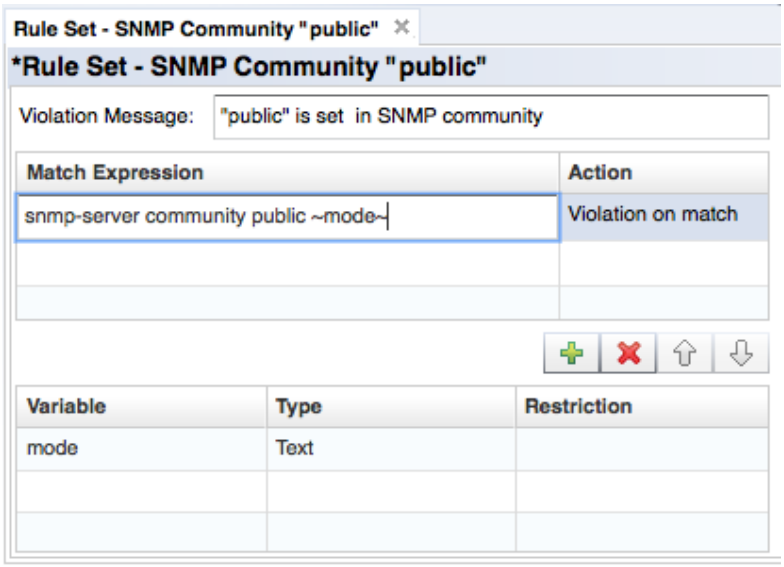


Enter a name for the rule, select the target adapter (the kind of device model) and which configuration to apply the rule to (`running-config` or `startup-config`). Click on the OK button.

In the *Violation message* field, enter the message to be shown when a violation occurs. The violation message in this example is "*public*" *is set in SNMP community*. After that, click on the .



Enter the violation search query in *Match Expression* and select *Violation on match* in *Action* field.



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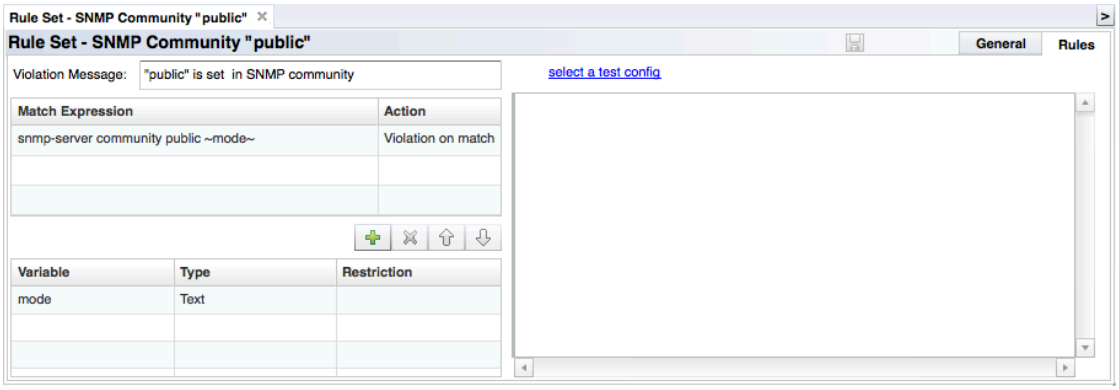
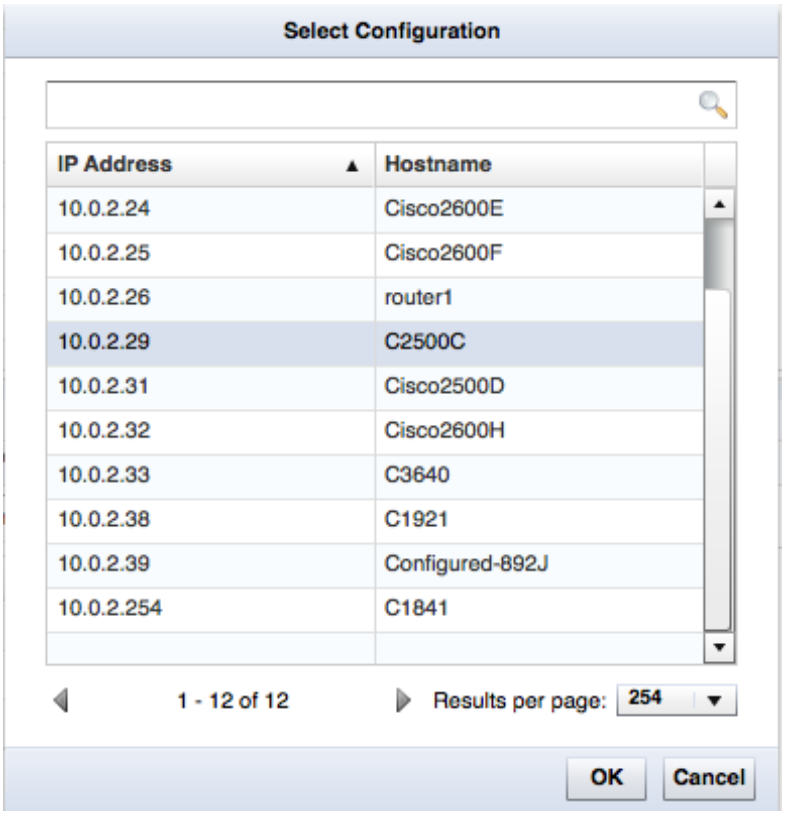
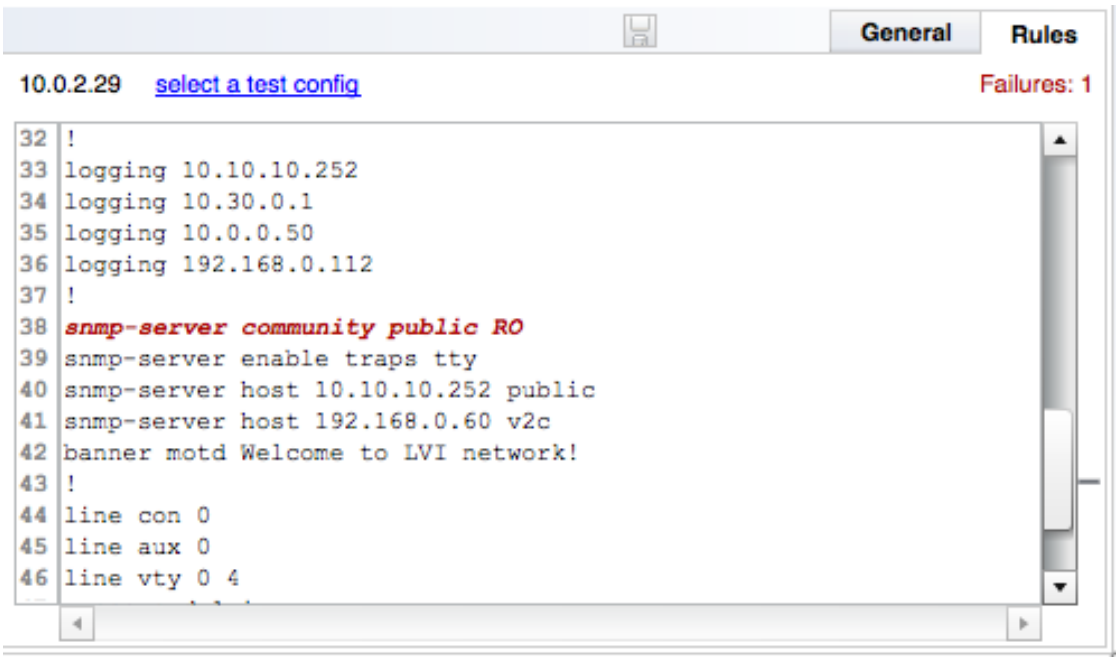
To test the new rule, click on the select a test config link and select a device in the inventory.



Select Configuration window lists the devices that match the adapter you have selected when you created this rule. In this case, only devices with *IOS* adapter are present in this list.



Violations are colored in red. Once you are satisfied, make up a policy from the set of rules in the next section.



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3.10.3 Policy tab

Policy tab consists of the following subtabs:

Device subtab allows you to select devices to which you will apply a policy. The interface is exactly the same as those described in *Jobs Management* section (p.92).

Rule Sets subtab register the existing *rule sets* to the policy in this tab.

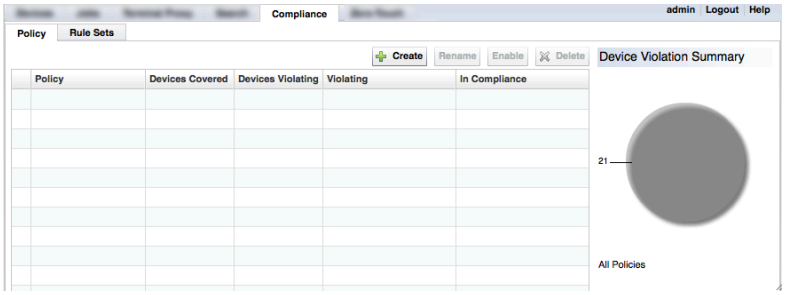
Item	Description
All devices	Apply the policy to all devices in the inventory.
Search	Apply the policy to all devices that match the query. The search is conducted every time the violation check was triggered.
Static List	Choose a set of devices by switching the main pane to the device tab, create a static list and the violation check is applied only to the devices in the list. (*tab switching technique*)

Item	Description
Adapter	Specify the target adapter.
Configuration	Choose from either `startup-config` or `running-config`. The check is applied to the specified configuration only.
Rules set	Rules in this policy.
Severity	Either *Error* or *Warning*. This results in the different visual icons when a violation occurred.

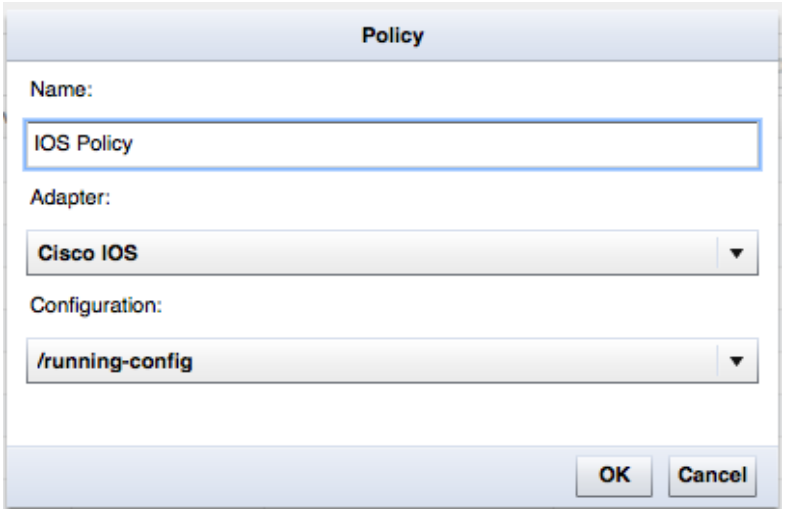
Creating a New Policy

Let's create a policy here that will generate a violation for Cisco IOS device configurations.

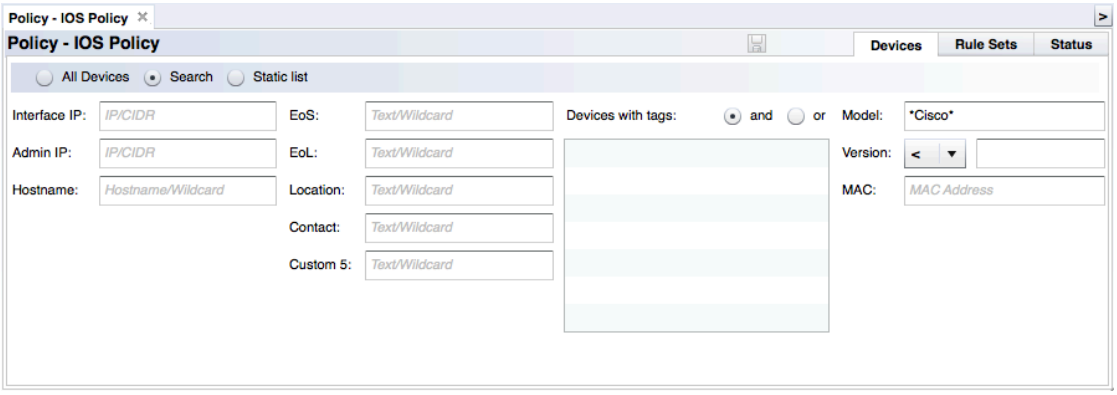
Click on in Compliance → Policy tab.



Enter a policy name, select the target adapter and configuration, then click on the OK button.



Select *Search*. Enter a search query which selects the target devices. In this example, enter `*Cisco*` in Model filter. As a result, the violation is checked against only those devices whose name contain a string `Cisco`.



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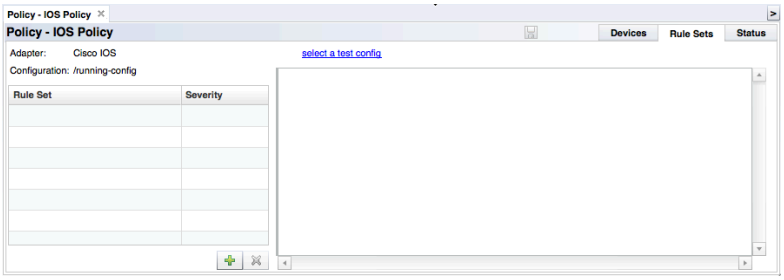
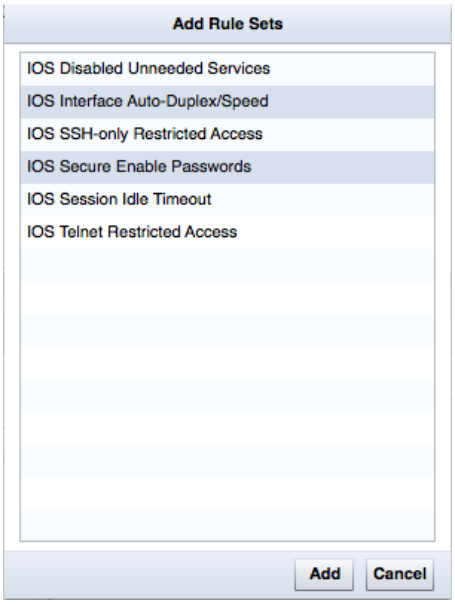
This process is the same as that has appeared in Sec. 3.7 (Job Management). Consequently, the same characteristics apply to this device selection: if you define the target devices via *Search*, then the search is done *in each time* the policy is checked.

Click on in Rule Sets subtab in the status pane.

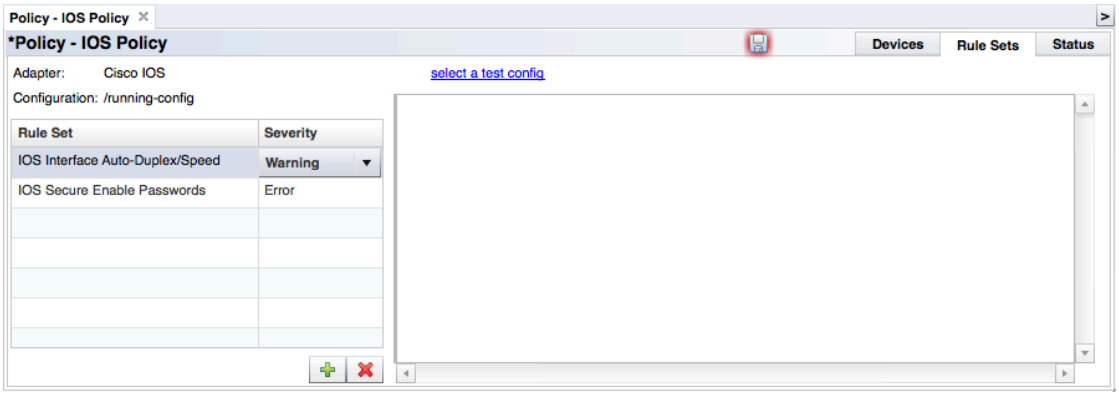


Select a rules-set and click on the Add button. In this example, we have selected *IOS Interface Auto-Duplex/Speed & IOS Secure Enable Passwords* rules.

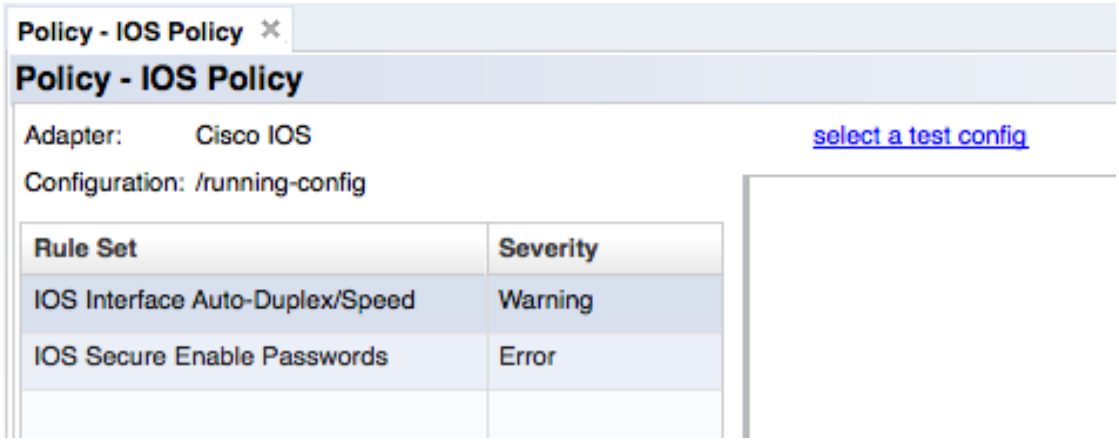


†[14]

Select a Severity for the rule. Here we select different severity for each rule so that different violation icons will show up.



Click on the select a test config link and select a device to test the policy.



[14]**IMPORTANT NOTE**: The rules that appear in this window is only those rules *whose adapter type matches that of the current policy*. If no rule appears in the candidates, then it means no rules are defined for the adapter which your policy is defined for. Please review the adapter type setting in your policy or rule-sets.

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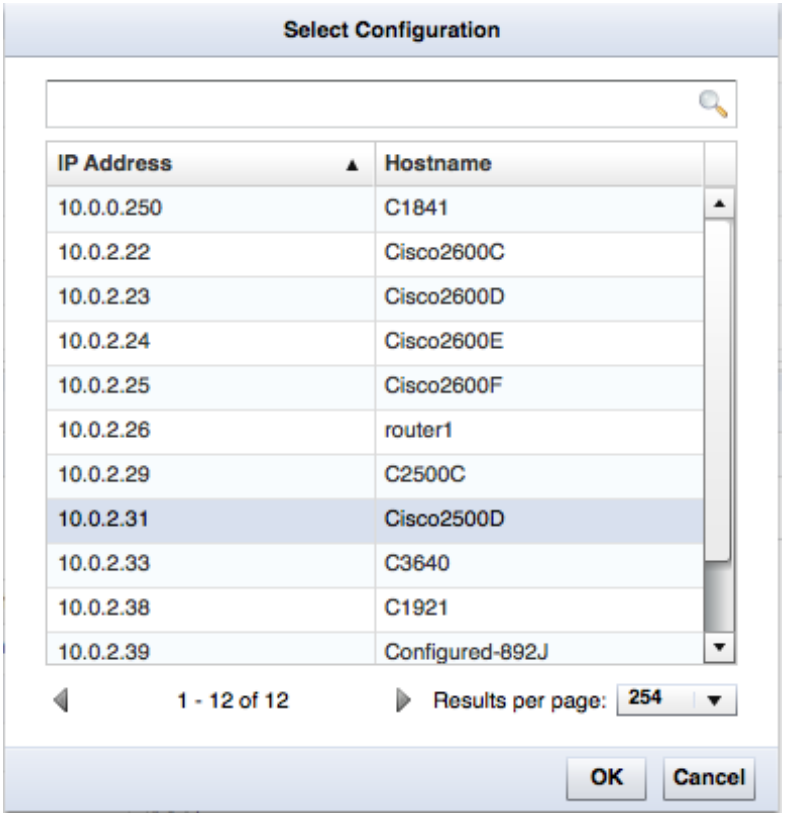
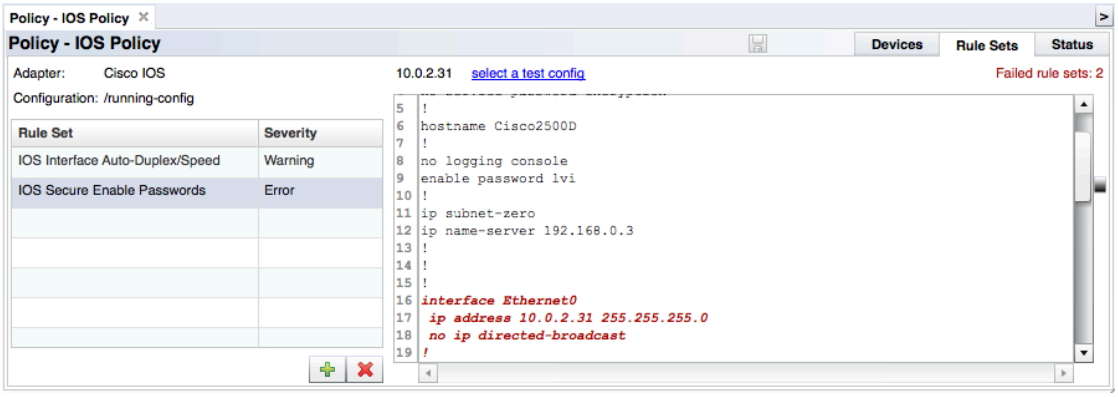
Select a test config.



Violations are colored in red. The top right number shows the total number of violations.

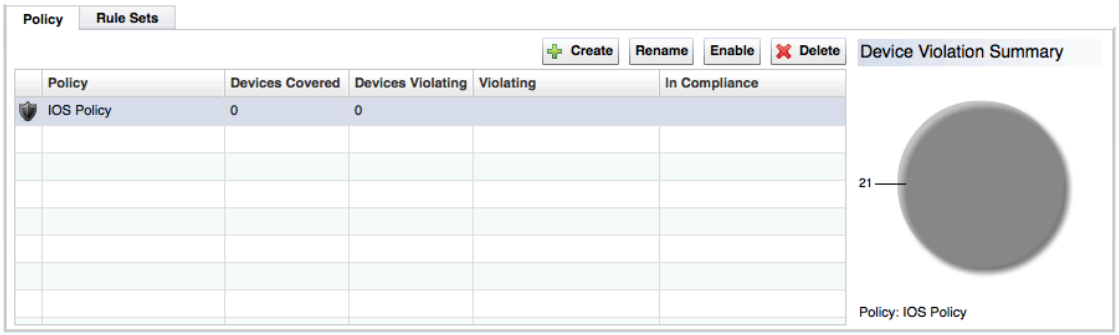
When you are satisfied with the test results, you should then *activate* the policy. Note that **netLD does not run the violation check** unless you activate it.



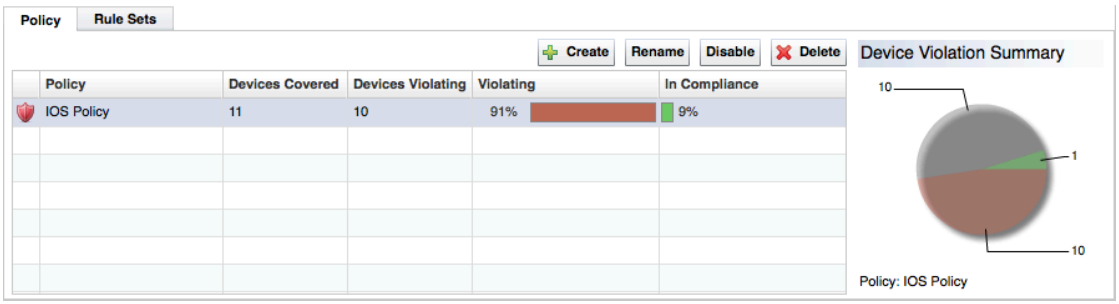
Activating the Policies

Once a policy was created, you should activate the policy to the devices. Make sure that the main pane shows *Compliance* → *Policy* subtab.

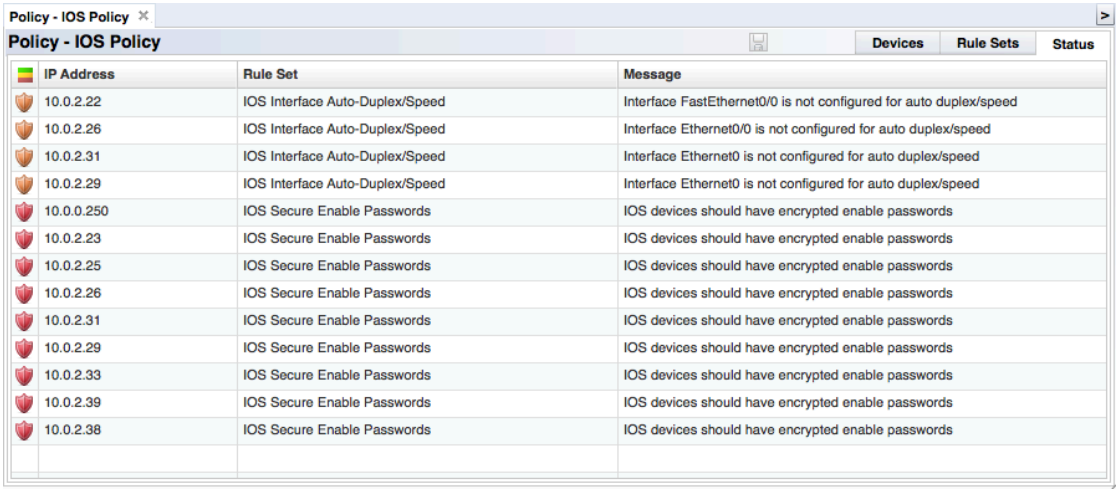
In *Policy* subtab, select a policy and click on the *Enable* button. You will see a pie graph in *violation summary* on the right.



If any violation was found in the policy, its icon changes. Depending on the severity, there will be an orange warning icon or a red error icon.



Then double-click on the violation icon. *Status* subtab opens in the status pane, showing the detailed information of the violation.



†[15]

[15] Violation icons are also shown in *Device View*. To see the detailed information of the violation, double-click on the warning/error icon.

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3.11 Draft Configuration

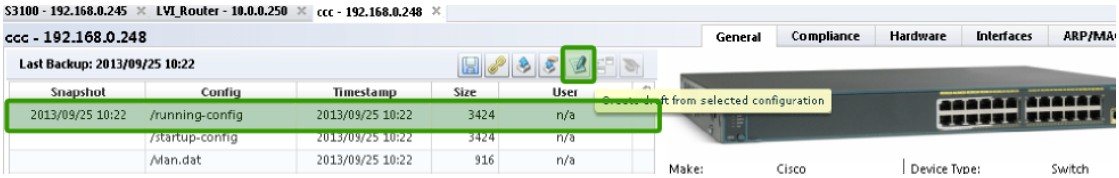
A *Draft Configuration* is a configuration that are saved independently of the backup history. It is treated just the same way as the normal configurations (in the backup snapshots) but it also has several difference: it has a name, it can be exported to/imported from a plain text files etc. It is useful when you reuse the same device configuration several times.

Figure 3.11.1: The buttons in the draft configuration pane

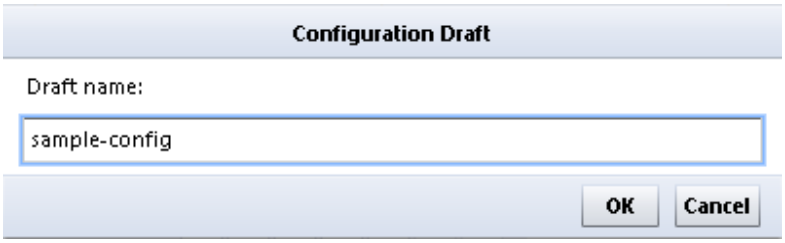
3.11.1 Creating a Draft Configuration

Draft configuration can initially be made by copying the existing configuration snapshot. Firstly, double-click on the target device to make a new draft configuration for the device.

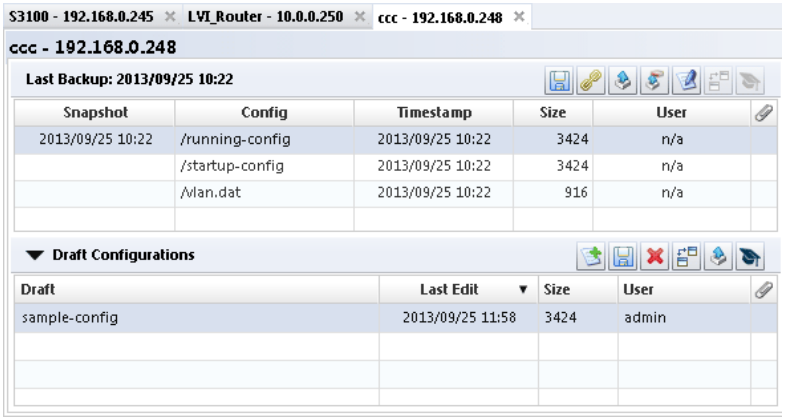
Click on a configuration snapshot to copy from, and then click on .



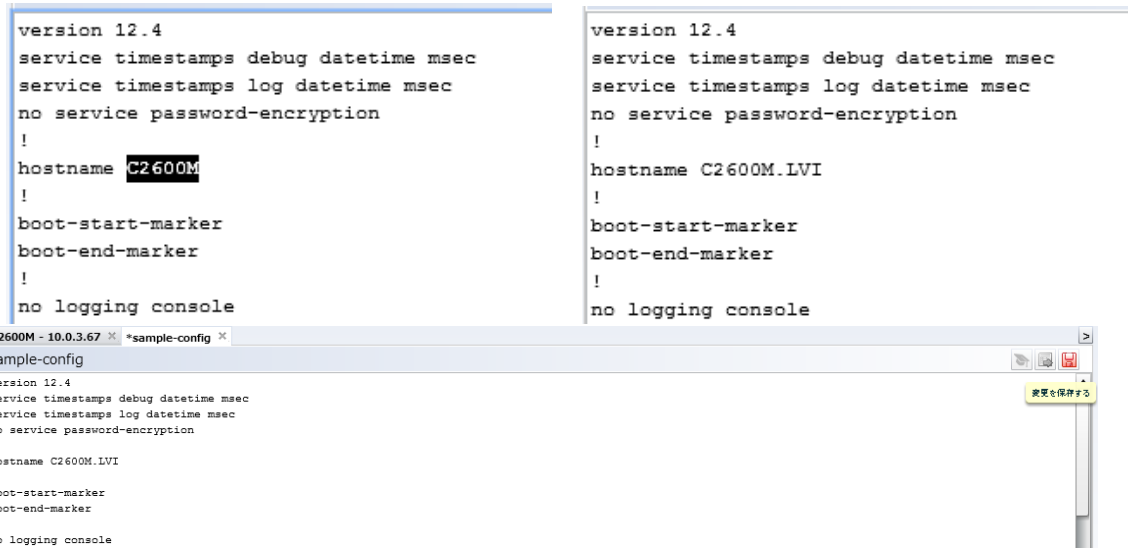
Enter the name for the draft configuration and click on the OK button.



To modify a draft configuration, double-click on the entry.



Edit the configuration. When finished, save the configuration via .



Then the timestamp in the Last Edit is refreshed.

3.11.2 Importing Configurations from Plain Texts

To create a new draft configuration from an external text file, double-click on the target device in *Device View* and open up the configuration history in the status pane.

(We assume that you already have a text file containing a configuration.)

Then click on the .

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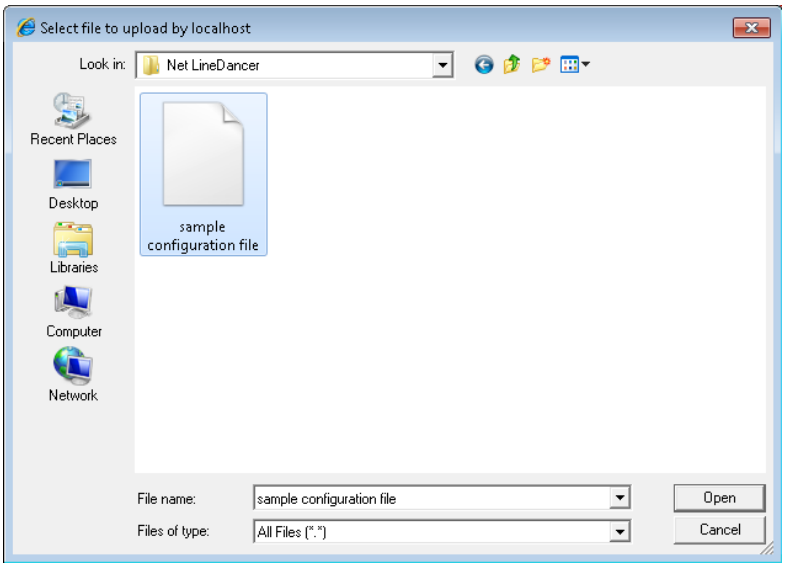
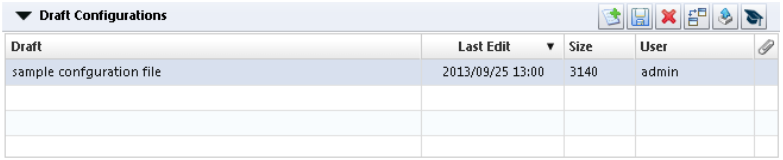
Select the file to import and click on the *Open* button just as in usual Windows software.



Then a new configuration is added to the list of Draft Configurations.



Exporting Drafts

Similarly, click on the to export the draft into a plain text.

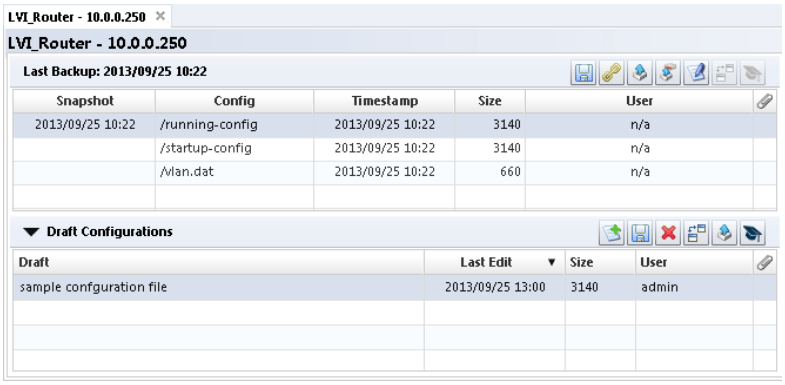
Deleting Drafts

To remove a draft, click on the .

3.11.3 Comparing the Configurations

You can compare the configurations via button. The methods for getting the comparison between *snapshot-to-snapshot, snapshot-to-draft, and draft-to-draft* are identical. For more information, see Sec. 3.4.5, p.71 (Compare).

Select two configurations for comparison and click on .

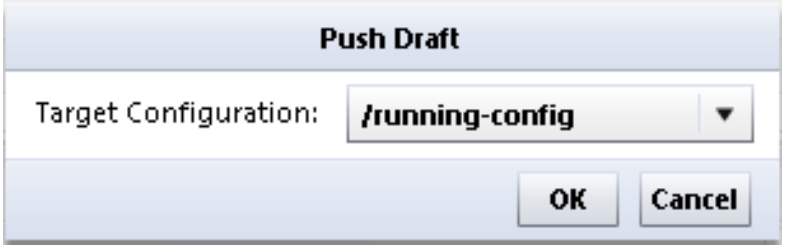


3.11.4 Applying a Draft Configuration to a Device

Similar to the comparison method, applying a draft is almost the same as applying (restoring) a past configuration snapshot to a device. However, there is a difference in one point (depending on the device):

Select a draft configuration for a push and click on .

Choose which configuration to push it to. (Either `running-config` or `startup-config`.) This is the only difference between restoring the configuration snapshot and uploading a draft configuration.



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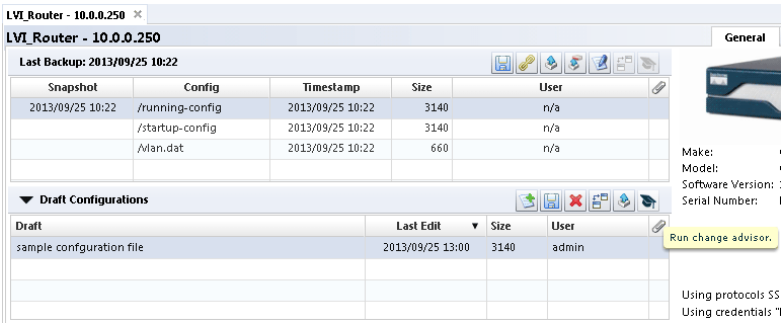
Click on the OK button to initiate an upload.

3.12 Change Advisor

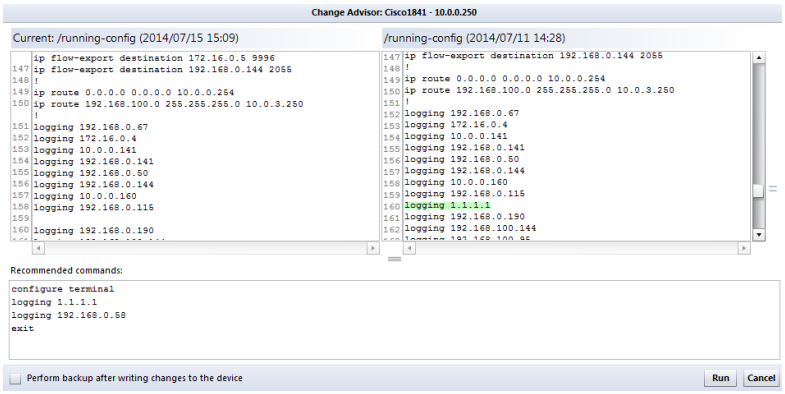
Change Advisor guesses the needs of the operator and automatically create a helpful advice by comparing the latest configuration with the selected configuration. Note: This feature is supported only on Cisco IOS and similar operation systems.

Press to initiate *Change Advisor*.



1. double-click on a device in Device View.
2. Select a configuration either from draft or snapshot configurations.
3. Click on .
4. Change Adviser is invoked and suggests some commands in the lower window.

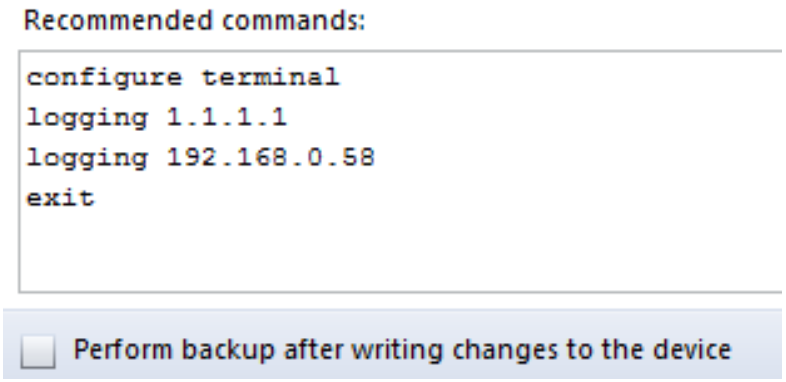
Change Adviser is initiated.



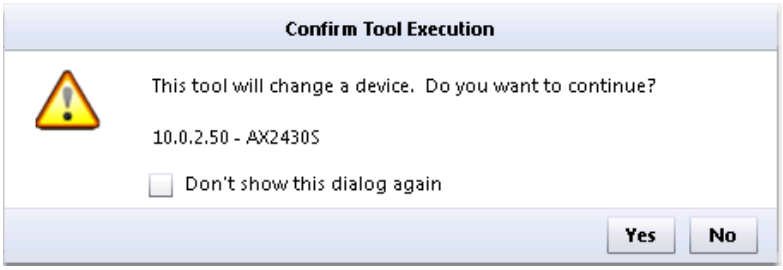
3.12.1 Executing Commands through Change Advisor

You can push the commands provided by Change Advisor into a device. Before running the command suggested by the advisor, please re-check the generated commands again. Once you have noticed any unintended suggestion, you can edit the generated commands directly.

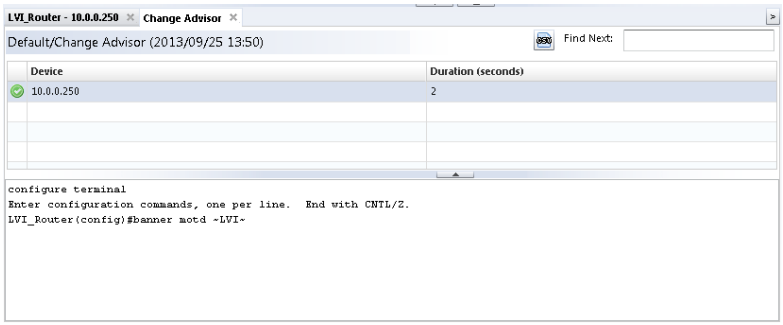
Re-check the generated commands again!



After that, click on *Run* and then confirm it by clicking on the *Yes* button to proceed.


Confirm Tool Execution
This tool will change a device. Do you want to continue?
10.0.2.50 - AX2430S
Don't show this dialog again
Yes
No

You can see the results of the command executions in CLI as they progress. The results are also shown in the job history Sec. 3.7.



†[16]

[16]During the configuration recovery and the draft configuration, the primary communication protocol is TFTP. Therefore, these features are not available in devices with no support for TFTP. On the other hand, Change Advisor is available in all devices supporting some CLI(telnet/SSH).

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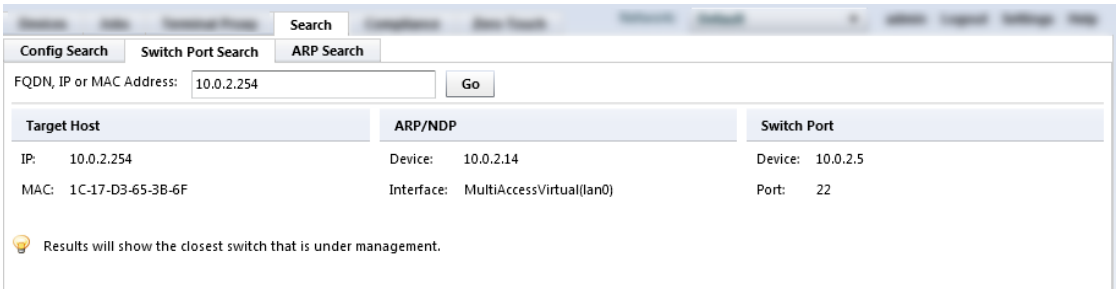
3.13 Search Tab

This section describes the various advanced search methods that are accessible in *Search Tab*. These methods do *NOT* have something to do with the *device search*. *Search Tab* consists of two subtabs, *switch port search* and *ARP search*.

3.13.1 Switch Port Search

Switch Port Search allows you to search devices by specifying FQDN (Fully Qualified Domain Name), IP address or MAC address of the device. It shows ARP and NDP of the nodes or the information of the Switch Port. The following example shows the result for switch port search by specifying an IP address "10.0.2.254".

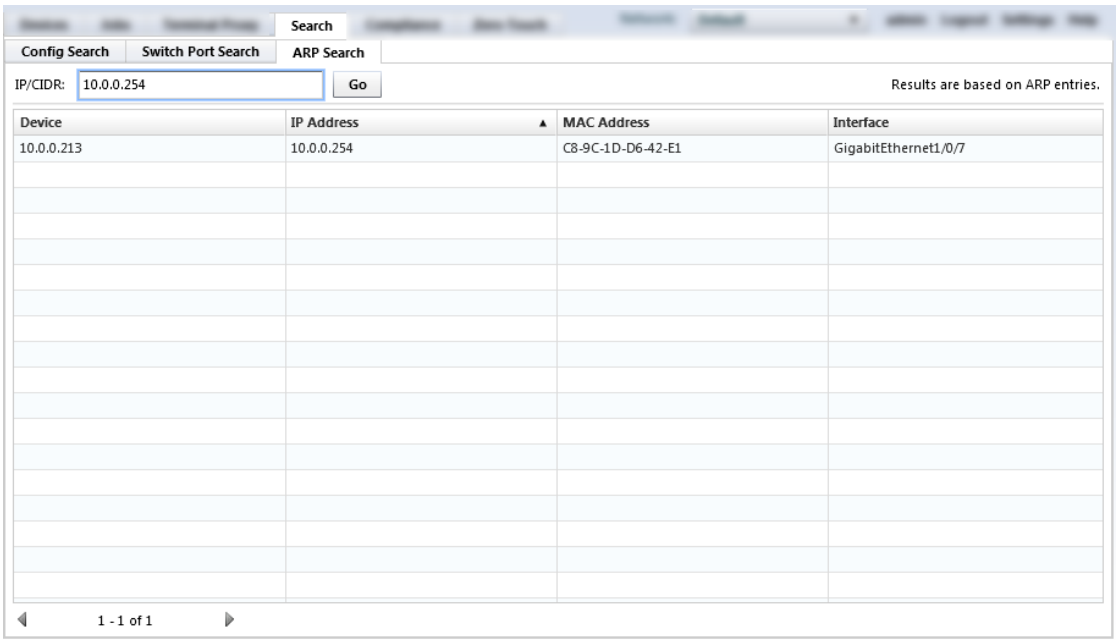
Figure 3.13.1: Port search.



3.13.2 ARP Search

ARP Search searches for any device that has the query IP in its ARP table. In the example below, we have that the ARP table in a device "10.0.0.213" contains the specified IP 10.0.0.254.

Figure 3.13.2: ARP table search.



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Chapter 4

Advanced Tools

In this chapter, we describe the tools which are required when you need to manage the professional and commercial large remote networks under the high availability constraints and the high maintenance costs that occur when the appropriate tools are not applied.

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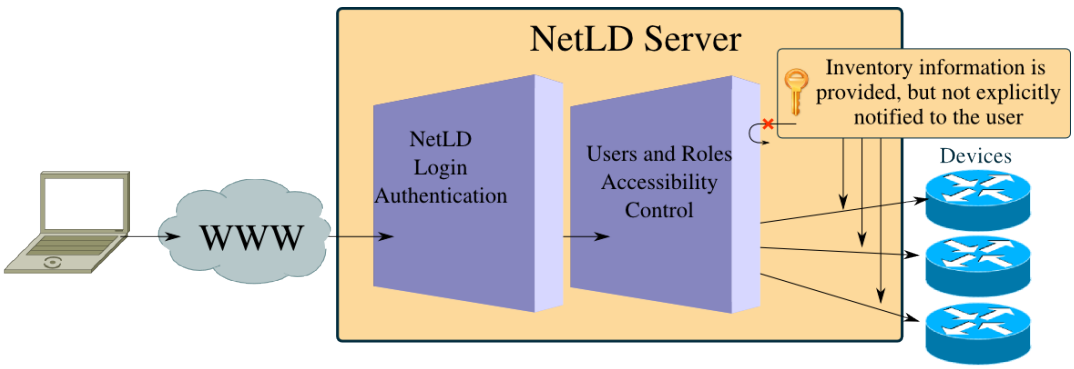
4.1 Terminal Proxy Tab

Terminal Proxy feature allows remote clients to log in to the managed devices through netLD server. One useful aspect of using Terminal Proxy is that you do not have to input the login information on the console — netLD automatically feeds the information for you. It also logs all the operation history with various information that can be later reviewed when something happens.

Also, using this feature results in the more secure network because the password do not have to be sent through the World Wide Web. Moreover, outsourcing the management effort is more secure because the operators do not have to know the actual device password. The outside operators, they just have to know the login passwords of Net LineDancer instances and *NOT* the device passwords, avoiding access to the critical security information in your network.

Consequently, Terminal Proxy provides a centralized management of the devices (even on the devices beyond netLD backup coverage).

Figure 4.1.1: Operation Model of Terminal Proxy



To set up the Terminal Proxy feature, follow these steps described in this section:

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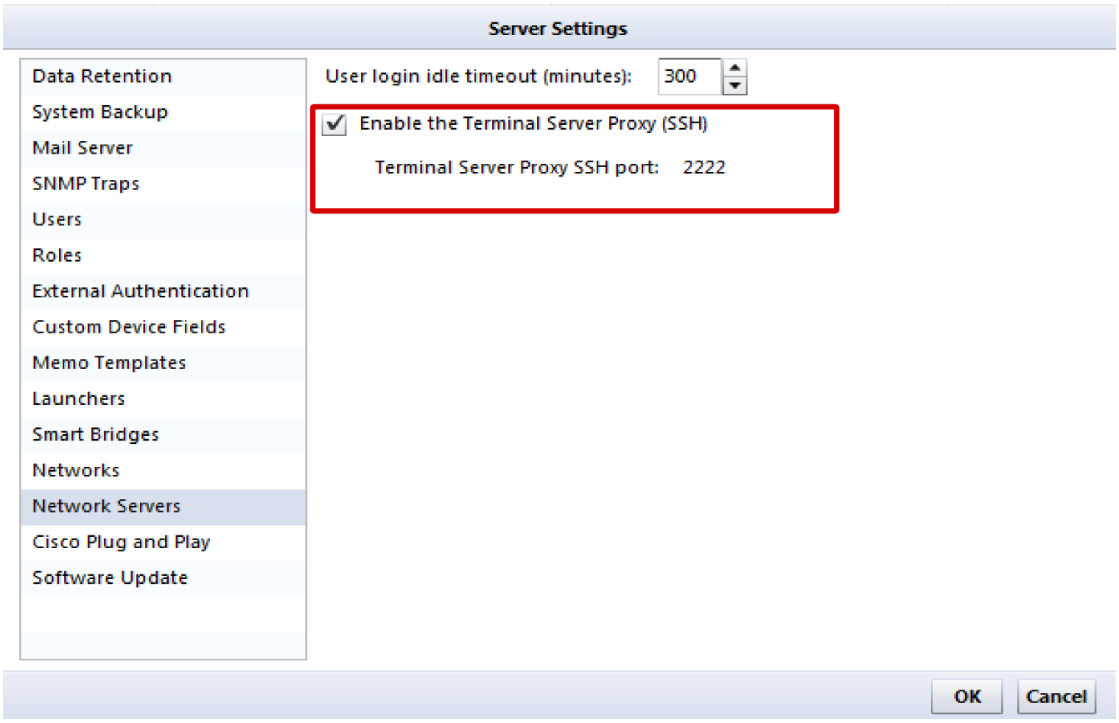
4.1.1 Available Commands

Command	Example	Description
`connect` (IP address or host name)	`connect 192.168.10.0`; `connect cisco`	Connect to devices with either SSH or telnet. (You have to set up the Credentials prior to the connection.)
`connect` (initials)	`connect c`	Show the list of upto 20 devices starting with the character.
`device` (IP address or host name)	`device 192.168.10.0`; `device cisco`	Show the details of the device.
`device` (initials)	`device c`	Show the list in just the same way as `connect` command does.
`exit`		Terminate the SSH session with netLD.
`help`		Show the list of commands.
`network <network name>`		Switch the current network (in terms of Sec. 2.5) to the specified one.
`version`		Show the current version of netLD.

4.1.2 Setup the Terminal Proxy

First, since this feature is disabled by default, enable Terminal Proxy in the settings window. Go to *Settings* → *Network Servers* and check on the *Enable the Terminal Server Proxy (SSH)*. You can change the port that SSH communicate through with the *Terminal Server Proxy SSH Port* below. Click on the OK button to save the change. **Remember that you must open the access to the SSH port in your firewall program!**



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4.1.3 Login

Before trying to log in, take a memo of the netLD server IP address.

First, open and start an SSH client and connect to the netLD server. The type of the client does not matter – you can use a standard OpenSSH on various OSes like UNIX, Mac OSX, Linux and Windows machines (additional installation is required on Windows.) In this example, we assume the server is `192.168.0.77` and the client is `bash`. **Again, remember that you must open the access to the SSH port in your firewall program!**

```
bash>
```

Log in to the netLD server as an usual SSH session. The username and password are the same as those used in the usual browser GUI interface login. Note that you have to specify the appropriate port upon login. On Linux version it is 2222 and on windows version it is 22 (same as what SSH uses by default). Check the port at *Terminal Server Proxy SSH port* in *Server Settings window* → *Network Servers*.

```
bash> ssh admin@192.168.0.77 -p 2222
admin@192.168.0.77's password:
Active network: Default
Welcome to Net LineDancer - 2014/03/26 11:33:20 JST
netld#
```

Connect the IP address of a device with `connect <IP address or host name>`. You can automatically login to the devices as an administrator, with already `enabled` state, as long as netLD already has the correct credential information of the device.

```
netld# connect 10.0.2.2
connect 10.0.2.2
Resolving device 10.0.2.2...
Connecting to device 10.0.2.2...

Warning: skipping login authentication until
an administrative user is added.

NEC Portable Internetwork Core Operating System Software
Copyright Notices:
Copyright (c) NEC Corporation 2001-2010. All rights reserved.
Copyright (c) 1985-1998 OpenROUTE Networks, Inc.
Copyright (c) 1984-1987, 1989 J. Noel Chiappa.
IX2025_LVI# enable-config
Enter configuration commands, one per line. End with CNTL/Z.
IX2025_LVI(config)#
```

†[1]

When you are done, enter `exit` several times to go back to the netLD SSH session. (However the number is device-specific.) The first `exit` is for exiting the `enabled` mode in the device CUI and the second `exit` is for exiting the session with the device. Upon logout, netLD takes a backup automatically. Also, when a configuration change has been detected, the event is automatically stored into the configuration history.

```
IX2025_LVI(config)# exit
exit
IX2025_LVI# exit
exit

Connection to 10.0.2.2 closed.
netld#
```

To exit the netLD session, again hit `exit`.

```
netld# exit
exit
Connection to 192.168.0.77 closed.
bash>
```

Auto completion

During the session with the netLD server, `connect c` shows the list of top 10 host names starting with `c` in your network. Enter the key number of the device, then hit Enter. It automatically tries to log in, and when successful, the prompt on the device appears. Also, the auto-completion is available, e.g., `connect c <Tab>` shows all host names starting from `c`. When the target device was not in the list, you can narrow down the list of the matched devices by entering additional characters, like `cisco <Tab>`, and the list contains only the devices starting with `cisco`.

[1] You cannot login to the devices in the *Network* which you are not authorized. Without an authorization, you can login only to the devices in the *Default* network. To switch the network, enter `network <network name>`. More descriptions are available in Sec. 2.5, p.35.

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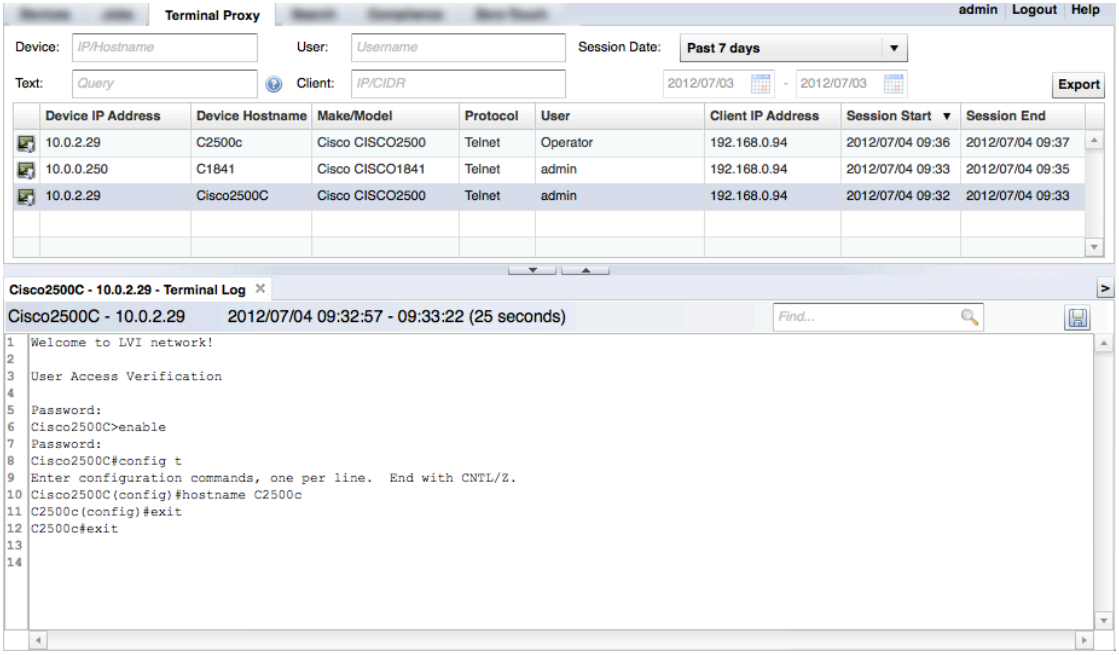
4.1.4 Terminal Proxy Log

You can check the terminal proxy history in Terminal Proxy tab. double-click on a log and you will see the detailed log on the lower pane.

Terminal Proxy log.

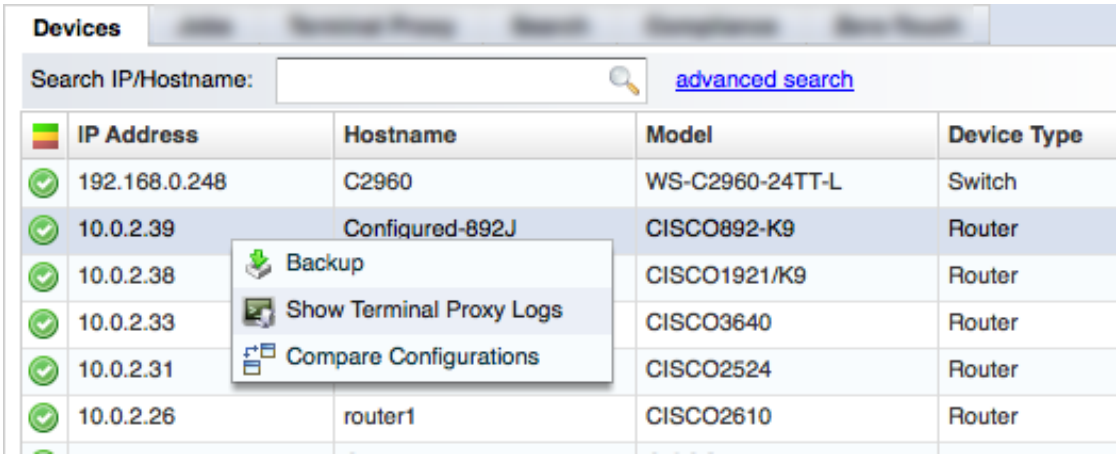

Terminal Proxy
admin Logout Help
Device: IP/Hostname
User: Username
Session Date: Past 7 days
Text: Query
Client: IP/CIDR
2012/07/03 - 2012/07/03
Export
Device IP Address | Device Hostname | Make/Model | Protocol | User | Client IP Address | Session Start | Session End
10.0.2.29 | C2500c | Cisco CISCO2500 | Telnet | Operator | 192.168.0.94 | 2012/07/04 09:36 | 2012/07/04 09:37
10.0.0.250 | C1841 | Cisco CISCO1841 | Telnet | admin | 192.168.0.94 | 2012/07/04 09:33 | 2012/07/04 09:35
10.0.2.29 | Cisco2500C | Cisco CISCO2500 | Telnet | admin | 192.168.0.94 | 2012/07/04 09:32 | 2012/07/04 09:33
Cisco2500C - 10.0.2.29 - Terminal Log
Cisco2500C - 10.0.2.29 2012/07/04 09:32:57 - 09:33:22 (25 seconds)
Find...
1 Welcome to LVI network!
2
3 User Access Verification
4
5 Password:
6 Cisco2500C>enable
7 Password:
8 Cisco2500C#config t
9 Enter configuration commands, one per line. End with CNTL/Z.
10 Cisco2500C(config)#hostname C2500c
11 C2500c(config)#exit
12 C2500c#exit
13
14

Menu Items	Description
Device IP Address	Device IP address you logged in
Device Hostname	Hostname you logged in
Make/Model	Make/Model you logged in
Protocol	Protocol used
User	Login User
Client IP Address	IP address of original client login
Session Start	Time of Session Start
Session End	Time of Session End

In terminal log, there are five kinds of searches available.

Search	Description
Device	IP address and hostname you logged in
Text	Searches for the query Texts in the command input and output.
User	Login user of netLD
Client IP	The IP address that the user logged in from.
Session date	Specify the range of dates to search.

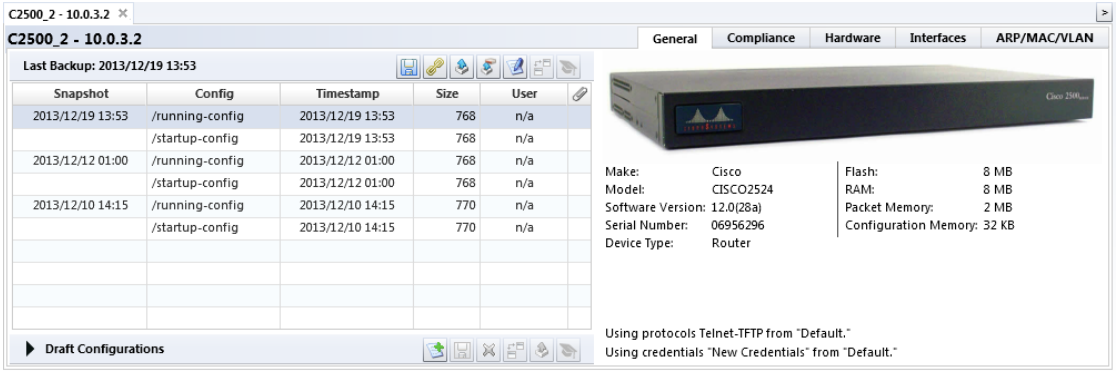
Tips: Right-click on a device in Device View, then click on the *Show Terminal Proxy Logs*. It provides an easy access to the terminal history of the device.



4.1.5 Verifying the Log from Change History

As in the normal backups, if a backup was performed due to the changes made in the proxy terminal, Configuration Change History shows the change, and you can check the backup status. Click on the button while selecting the configuration, and the change summary tab shows up in the status pane.

Click on the button while selecting the configuration.



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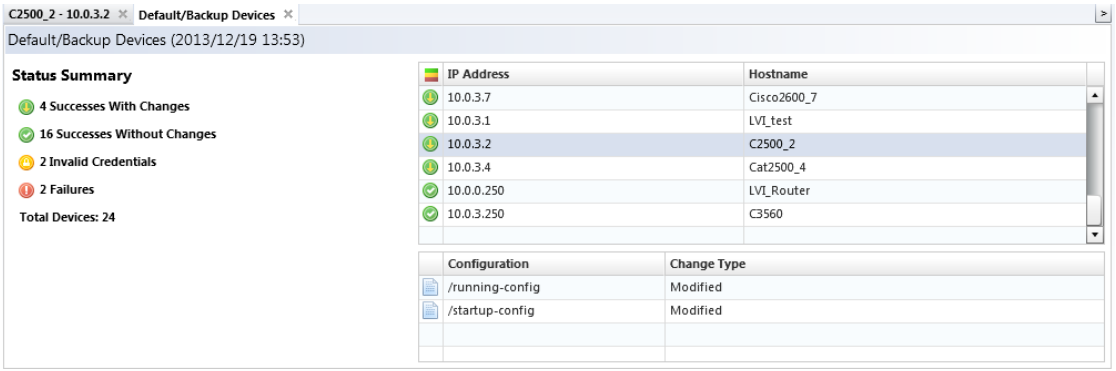
The change summary tab shows up in the status pane.



4.1.6 Exporting the Log Files

Clicking the *Export* button in the *Terminal Proxy Tab* in the mane pane creates an zip archive in a specified folder.

The files in the archive are organized into subdirectories as follows:

- `<filename>.zip`
  - `<network name>`
    - 10.0.0.1 (1812J-B)
    - 10.0.0.201 (cisco2500b.intra.dar.co.jp)
    - 10.0.0.203 (cisco2600a.intra.dar.co.jp)
    - 10.0.0.208 (C2801)
    - ...

4.2 Cisco Plug and Play (Optional)

Cisco Plug and Play(PnP), formerly known as netLD Zero-touch, is a feature that deploys configurations into remote devices using *Cisco IOS Auto Install* and *Cisco Networking Services* (CNS) feature of the device. The name *Cisco PnP* is named after their characteristics which allow the network devices to be automatically located in a network, "just like plugging a Plug-and-Play device into a computer." As soon as the device is connected to the network, netLD detect it automatically, sends an appropriate configuration and backup the device.

There are three deployment types for Cisco PnP:

- Template based deployment
- Cisco PnP recovery for the identical device
- Cisco PnP recovery for the alternative device

netLD Cisco PnP distributes the configurations via the following protocols.

- DHCP（Dynamic Host Configuration Protocol）
- DHCP option 150 (Cisco Network Registrar)
- TFTP（Trivial File Transfer Protocol）
- Cisco Auto Install
- Cisco Networking Services (CNS)

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Figure 4.2.1: Following figure shows the basic flows of Cisco PnP. For simplicity, DHCP, TFTP and netLD servers are displayed separately, but actually netLD runs all servers by itself.

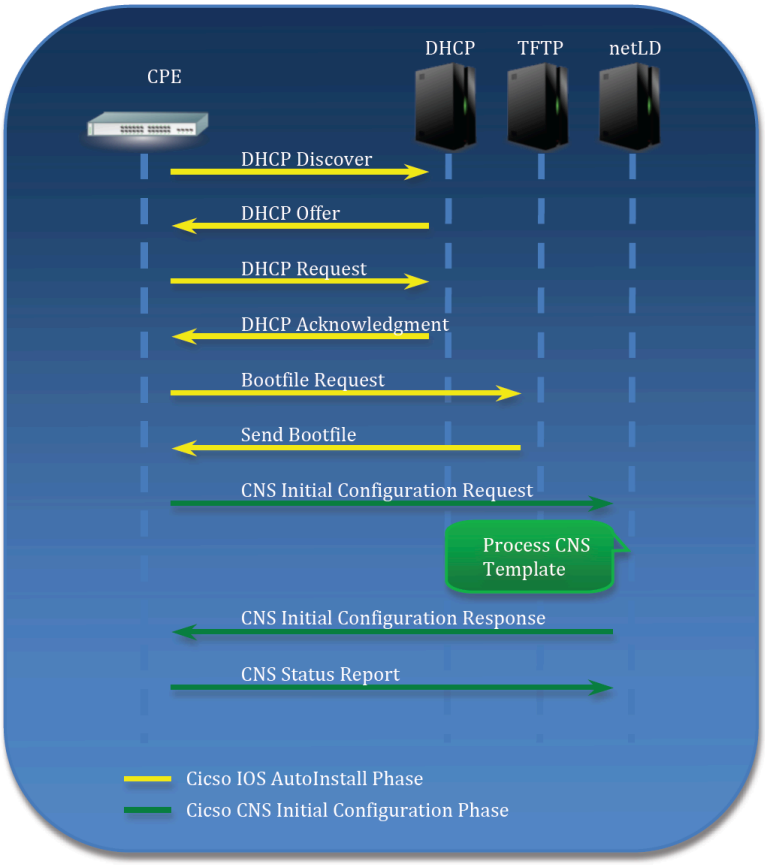
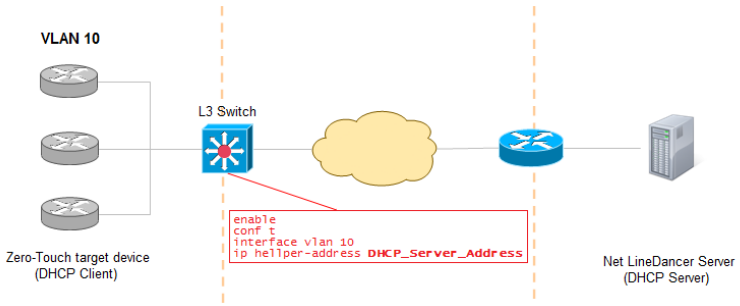


Figure 4.2.2: Example of DHCP Relay



4.2.1 Requirements for Using Cisco PnP Feature

To use Cisco PnP feature, make sure the following conditions are met:

- The target device is running IOS 12.2 or later releases with CNS Auto Install.[2]
- no `startup-config` - the device should not have a valid startup-config.[3]
- DHCP Server[4] - if you choose to use netLD DHCP Sever feature, the target device must be in an environment where DHCP server can distribute an IP address to the device. See Figure 2 for more details.

[2]You can check the available features of your IOS device in http://tools.cisco.com/ITDIT/CFN/jsp/index.jsp

[3]Select the option "without default configuration in nvram" when you order the device. If you need to delete configurations manually, use erase startup-config or erase nvram command and make the size of configuration in nvram to 0.

[4]If necessary, there is an additional option that you use an external DHCP Server that supports *TFTP boot files* option. If the target router is not connected directly to broadcast domain that netLD is locatable, you have to set *DHCP relay* on the relaying device and send DHCP requests to netLD.

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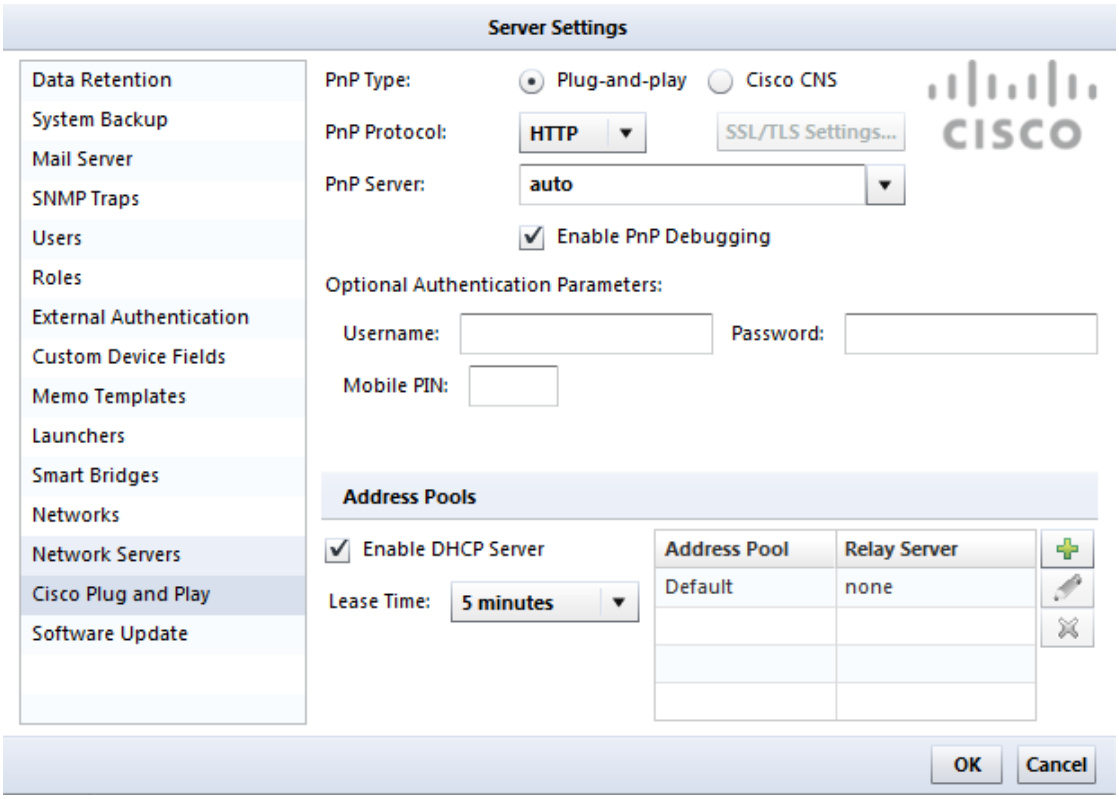
4.2.2 Setting up a DHCP Server

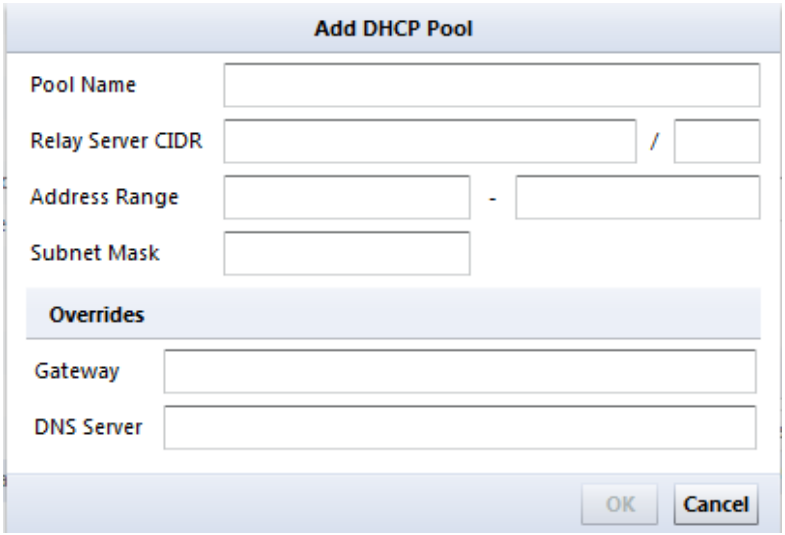
To use netLD DHCP server in netLD later than version 14.06, open *Settings* window and go to *Cisco Plug and Play* section.

This is *Cisco Plug and Play* section in *Settings* window. Click on to add a new DHCP pool.



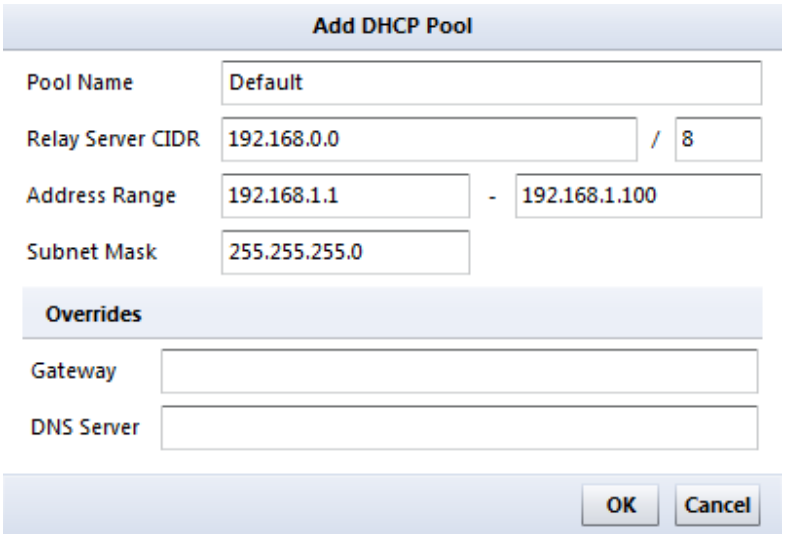
Menu Items	Description
Enable DHCP Server	Enable this checkbox to use the DHCP server feature in netLD.
Lease Time	Select the lease time from the dropdown list either 5 or 10 minutes.

Enter the required information.



Menu Items	Description
Pool Name	Enter the name of a newly created DHCP pool.
Relay Server CIDR	Enter the range of IP addresses in which DHCP Relay servers are running.
Address Range	The IP address range to deploy the configuration.
Subnet Mask	The subnet mask for the IP address range.
Gateway (optional)	The gateway address of the device that netLD should use. netLD executes deployment through the gateway of DHCP relay agent if this option is not specified.
DNS Server (optional)	An IP address of the DNS server used for the name resolution of the server.

The boxes are filled in. Click on the OK button.



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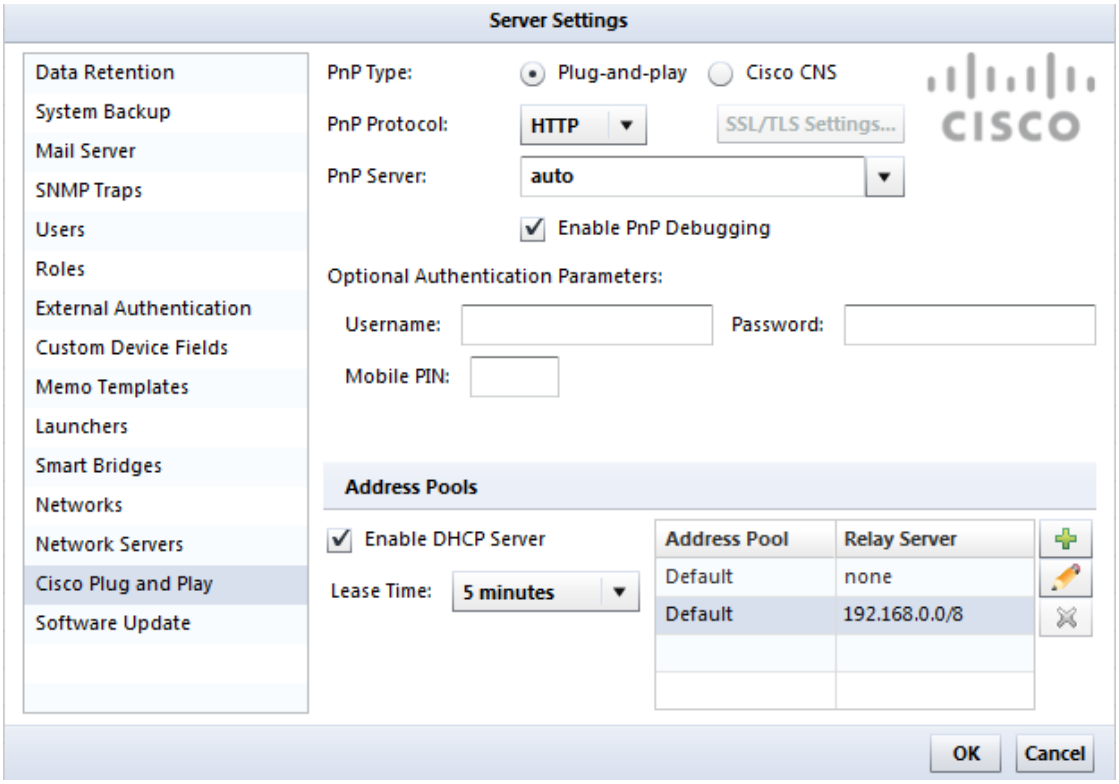
After that, there should be a new DHCP pool entry in the table.



Prior to netLD 13.08

Prior to netLD 13.08, DHCP server preferences can be configured in *Zero-touch* → *Settings* subtab. Move to the subtab and enter the required information.

Menu Items	Description
Enable DHCP Server	Enable this checkbox to use the DHCP server feature in netLD.
DHCP Relay CIDR	Enter the range of IP addresses in which DHCP Relay servers are running.
Address Range	The IP address range to deploy the configuration.
Subnet Mask	The subnet mask for the IP address range.
Gateway (optional)	The gateway address of the device that netLD should use. netLD executes deployment through the gateway of DHCP relay agent if this option is not specified.
TFTP Server (optional)	The IP address of the TFTP server if you use a TFTP server other than that of netLD.
DNS Server (optional)	An IP address of the DNS server used for the name resolution of the server.
Lease Time	Select the lease time from the dropdown list either 5 or 10 minutes.

To save the change in DHCP Server settings, Click on *Save* button in the upper right corner.

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Figure 4.2.3: If you are deploying configurations for more than one network segments, add DHCP pools by using button.

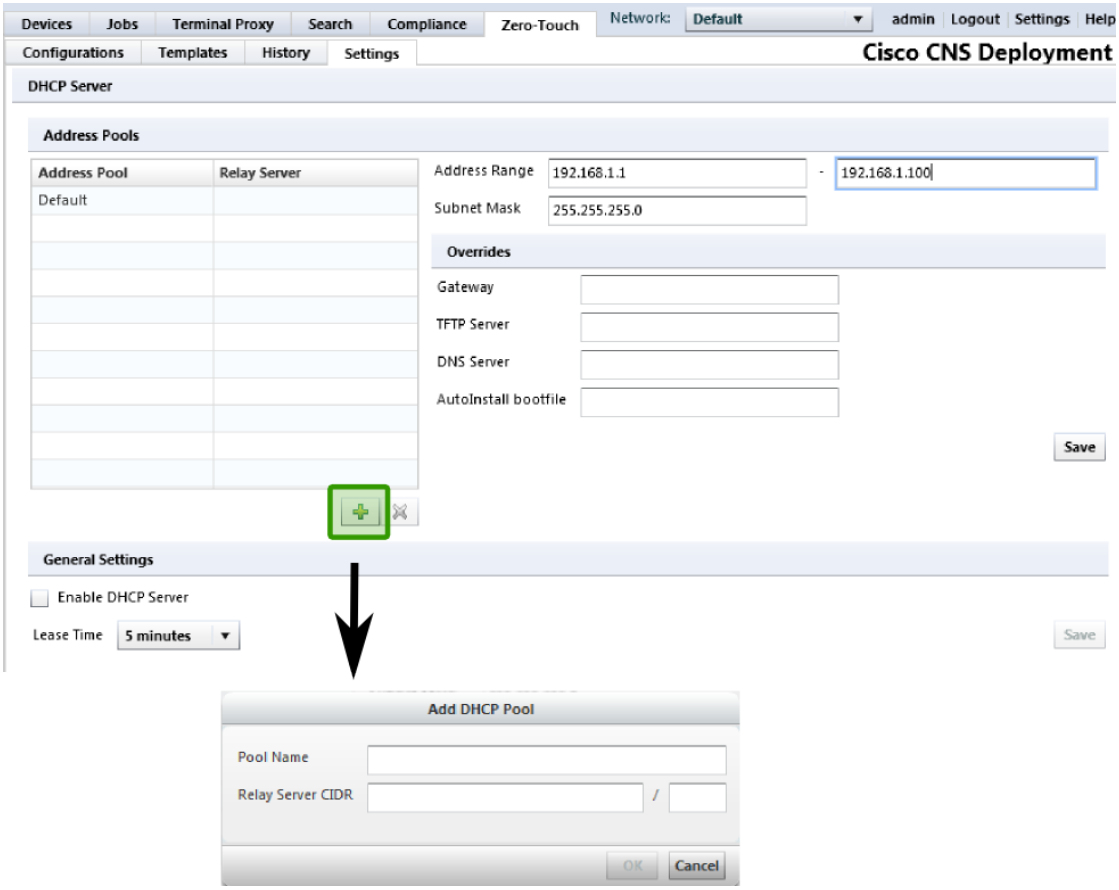
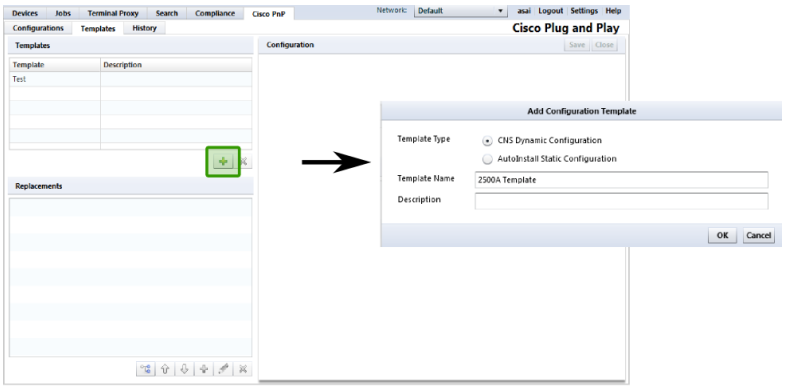


Figure 4.2.4: Adding a template from *Cisco PnP Tab* → *Templates*.



4.2.3 Template-Based Deployment

In a large network, sometimes there are many devices with similar configurations i.e. the difference is limited to the IP address, hostname, DNS or syslog servers. With aid of Master Configuration template, you can reduce the effort of customizing the configuration files for those devices. We assume you are already familiar with using a *template* feature in netLD. If you are not, then we strongly suggest you to read the *Smart Change* section p.108 to understand the concept of *template* first.

To build a master template, follow the instructions below.

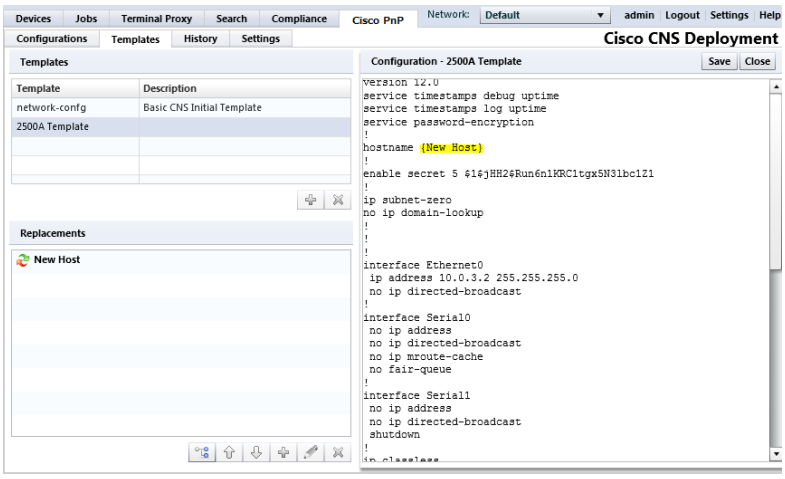
1. Move to Cisco PnP → Template Tab and click on to create a template (Fig. 4.2.4).

2. Select *CNS Dynamic Configuration* for the *Template Type* and enter the arbitrary template name in the *Template Name* field. Add *Description* if you want. Click on the OK button to move to the next dialog.

3. Enter a base configuration into the text field on the right. In most cases, the easiest way to achieve a base configuration is to copy the configuration from the other device.

4. Finally, follow the instructions in *Smart Change* section p.108 and make the configuration into a template.

Figure 4.2.5: When all the required replacements are added, save the template by clicking on the Save button in upper-right corner of the Configuration Editor.



†[5]

[5]If you do *NOT* want to save the configuration in the target device when it is deployed, add `no-persist` at the end of the `cns config initial...` sentence Fig. 4.2.6.

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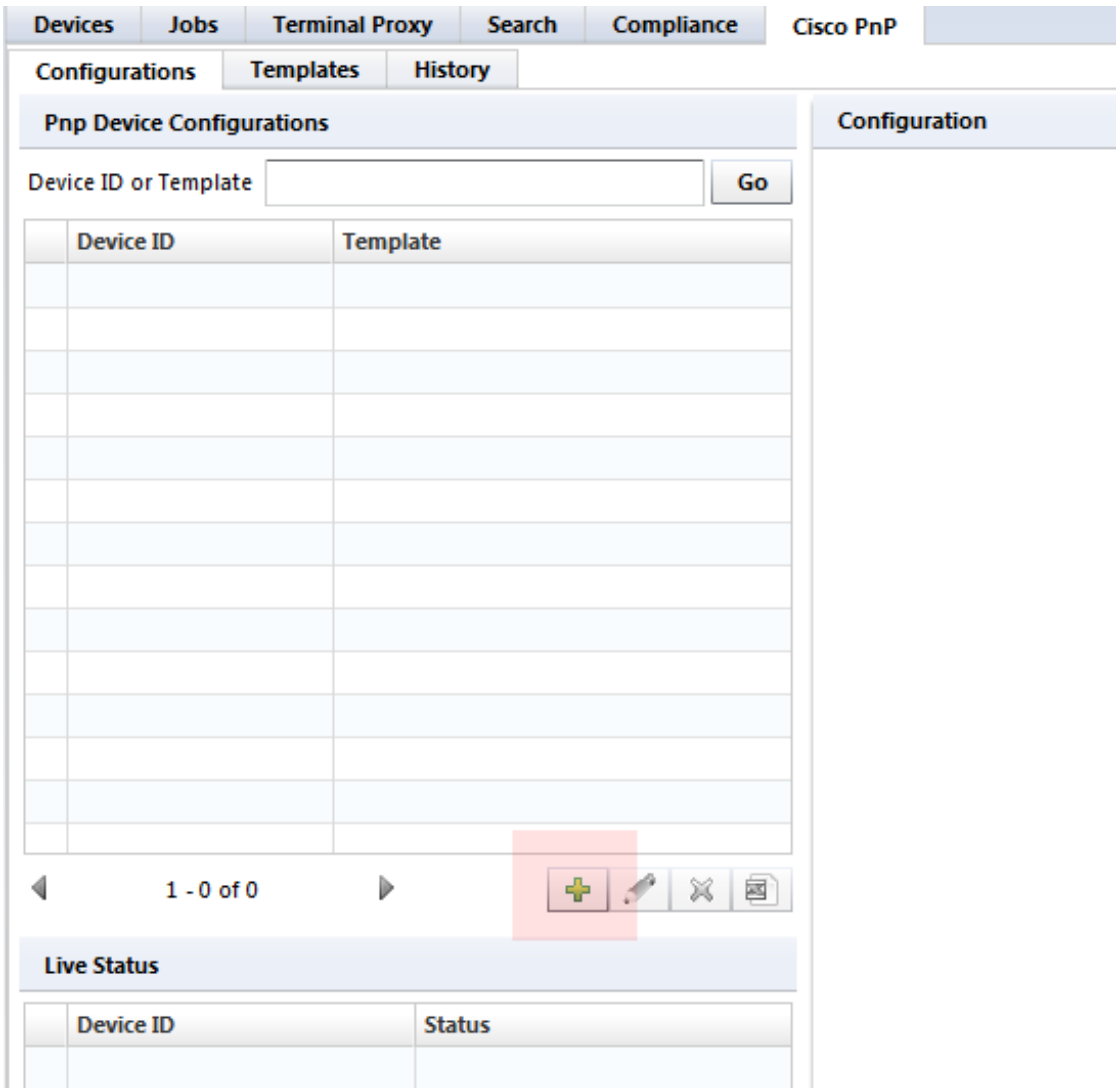
Figure 4.2.6: No-persist configuration

```
cns config initial ... no-persist
```

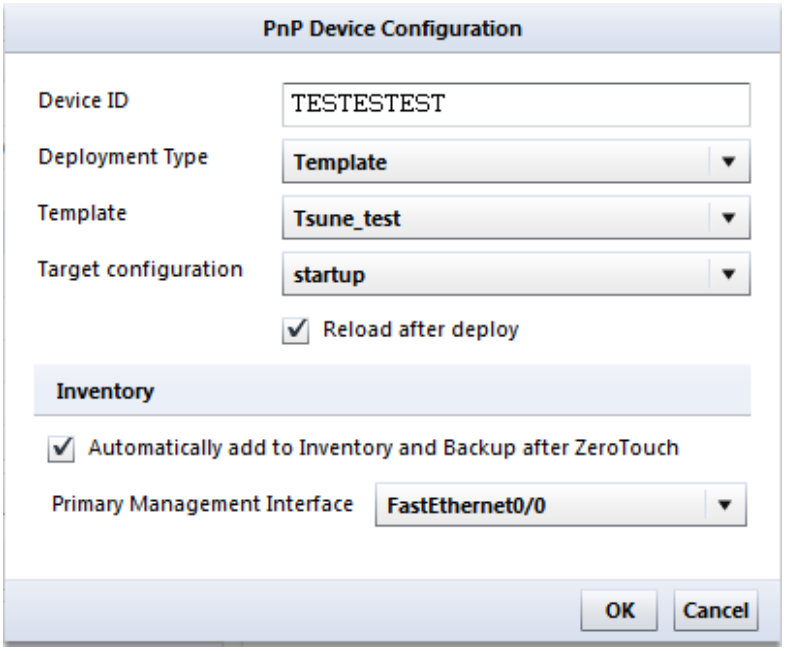
Registering devices

You have completed the preparation for the template required by Cisco PnP now. Next, you need to set the target devices and configurations to deploy, and set the replacement values if necessary.

First, move to *Configurations* subtab in the main pane, then click on .



Then fill in the information in the dialog and click on the OK button. Select the Template in Deployment Type. The table below describes the meaning of each field.



Menu Items	Description
Device ID	Specify a device ID according to the ID type selected in the above field.
Deployment Type	Select Template to deploy the configuration template you have created.
Template	Specify the template to be deployed.
Target configuration	Specify which configuration netLD should deploy the data to.
Automatically add to Inventory and Backup after ZeroTouch	Add the device to the inventory and get its backup configuration after Cisco PnP (Zero-Touch) is run.
Primary Management Interface	Select the management interface to use while adding the device. netLD parses the template and automatically infer which interface is available on that device. If no interface description is found in the configuration, then no item would appear in the list.

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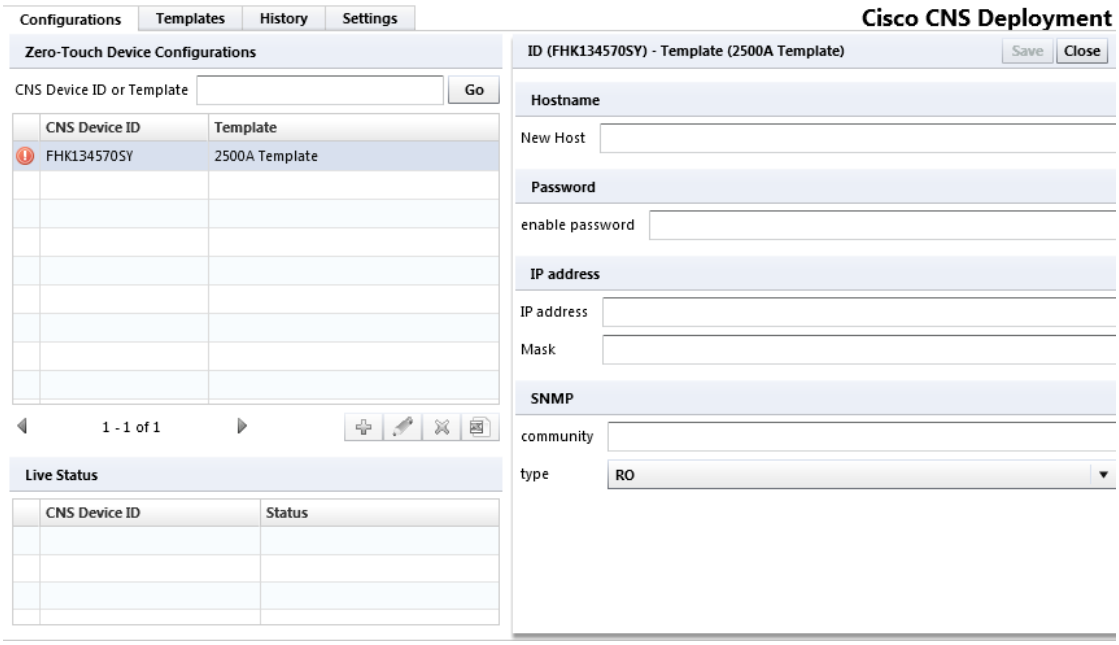
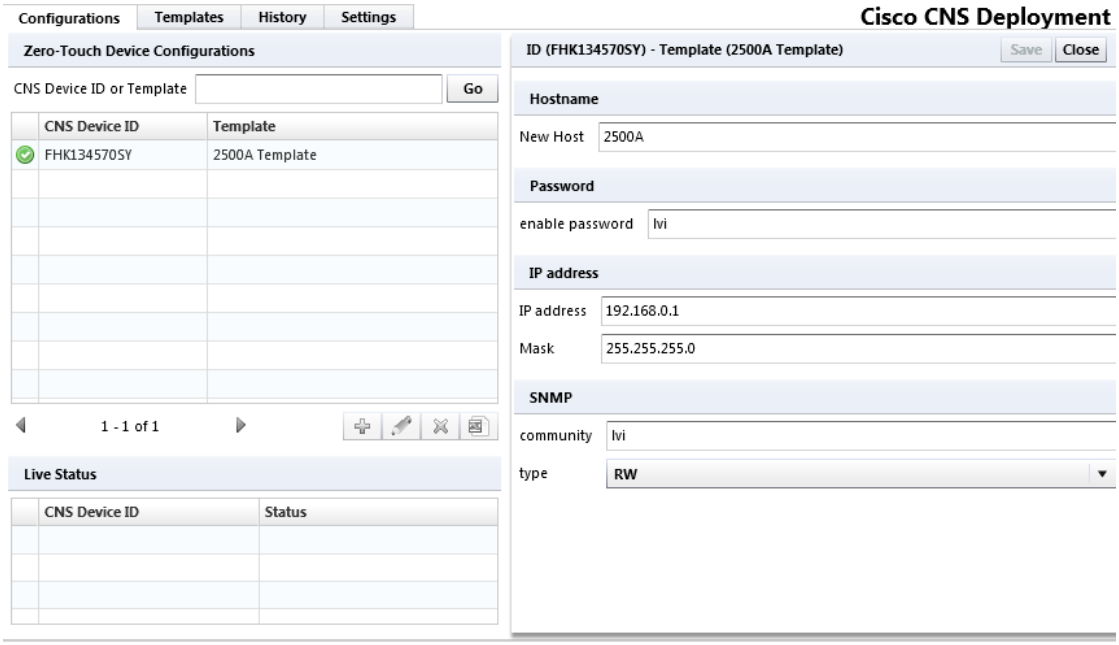
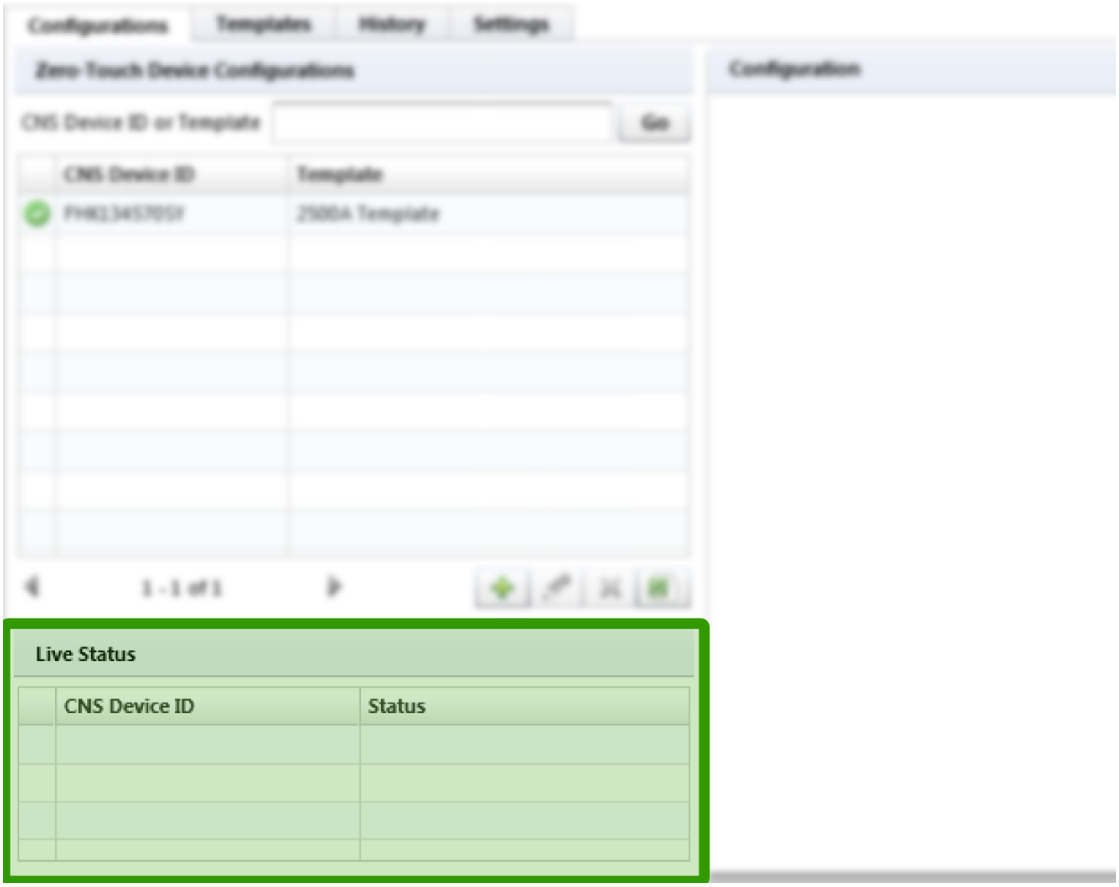
In the fields to the right, select each template variable and enter the parameter values for it.



If all the template value is filled in, then the leftmost status icon turns into
.

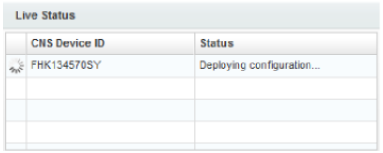


After connecting the target device to network, turn on the power of the device. As shown in Fig. 4.2.1, the device shifts to the Auto Install mode and tries to get an IP address by broadcasting DHCP/BOOTP request. After that, the device tries to receive a configuration file using TFTP. You can check the deployment job status in *Live Status* area.

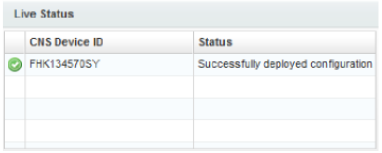


Live Status shows the current status of the deployment process.

During the deployment



Deployment Complete



After the deployment is completed, the device reloads automatically and the deployed configuration is applied. You can see the history of Cisco PnP job in History tab.

†[6]

[6]The maximum size of the configuration file per device is about 20KB.

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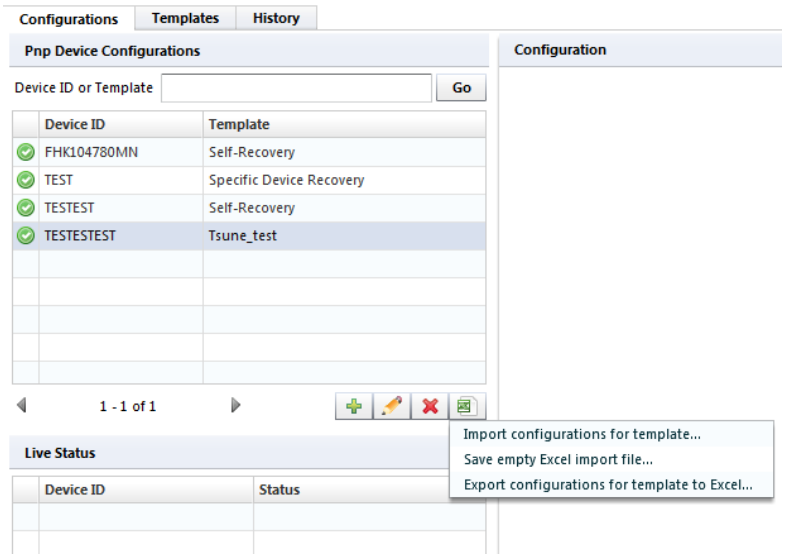
4.2.4 Importing the Replacement Values in Cisco PnP

This is a new feature introduced in version 11.04. Follow the instruction below.

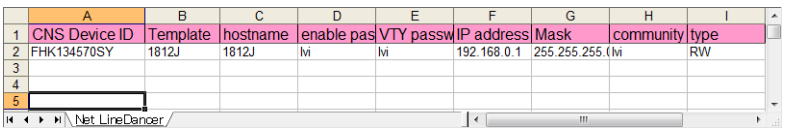
1. After you have set up the template, click on the *Close* button.
2. Click on button and select either *Save empty Excel import file* or *Export configurations for template to Excel* menu.

Showing *Save empty Excel import file* menu.

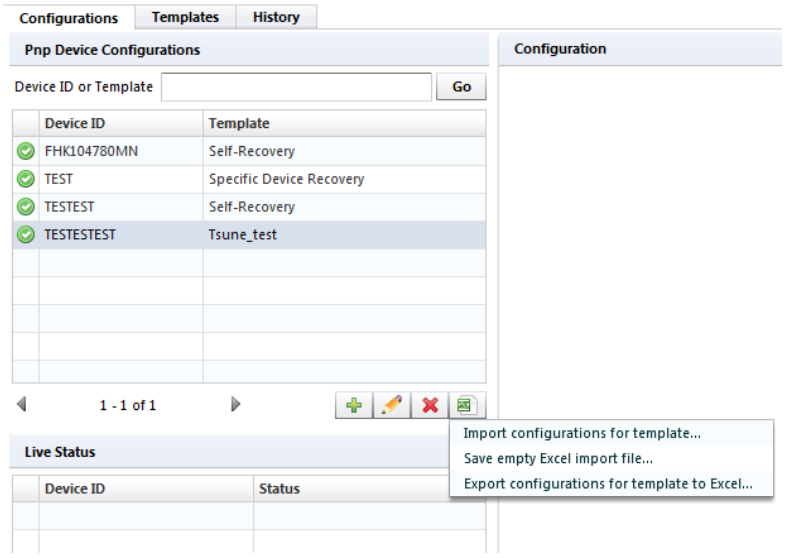


Menu Items	Description
Import configurations for template...	Import an excel data which contains the replacement values for the currently selected template.
Save empty Excel import file	Export a template with no value listed.
Export configuration for template to Excel	Export a template with replacement values currently set.

Open the exported file and edit or fill each replacement values. Save the change after editing the file.


A B C D E F G H I
CNS Device ID Template hostname enable pas VTY passw IP address Mask community type
FHK134570SY 1812J 1812J lvi lvi 192.168.0.1 255.255.255.(lvi RW
Net LineDancer

Back to netLD, click on button and select *Import configurations for template...* menu.



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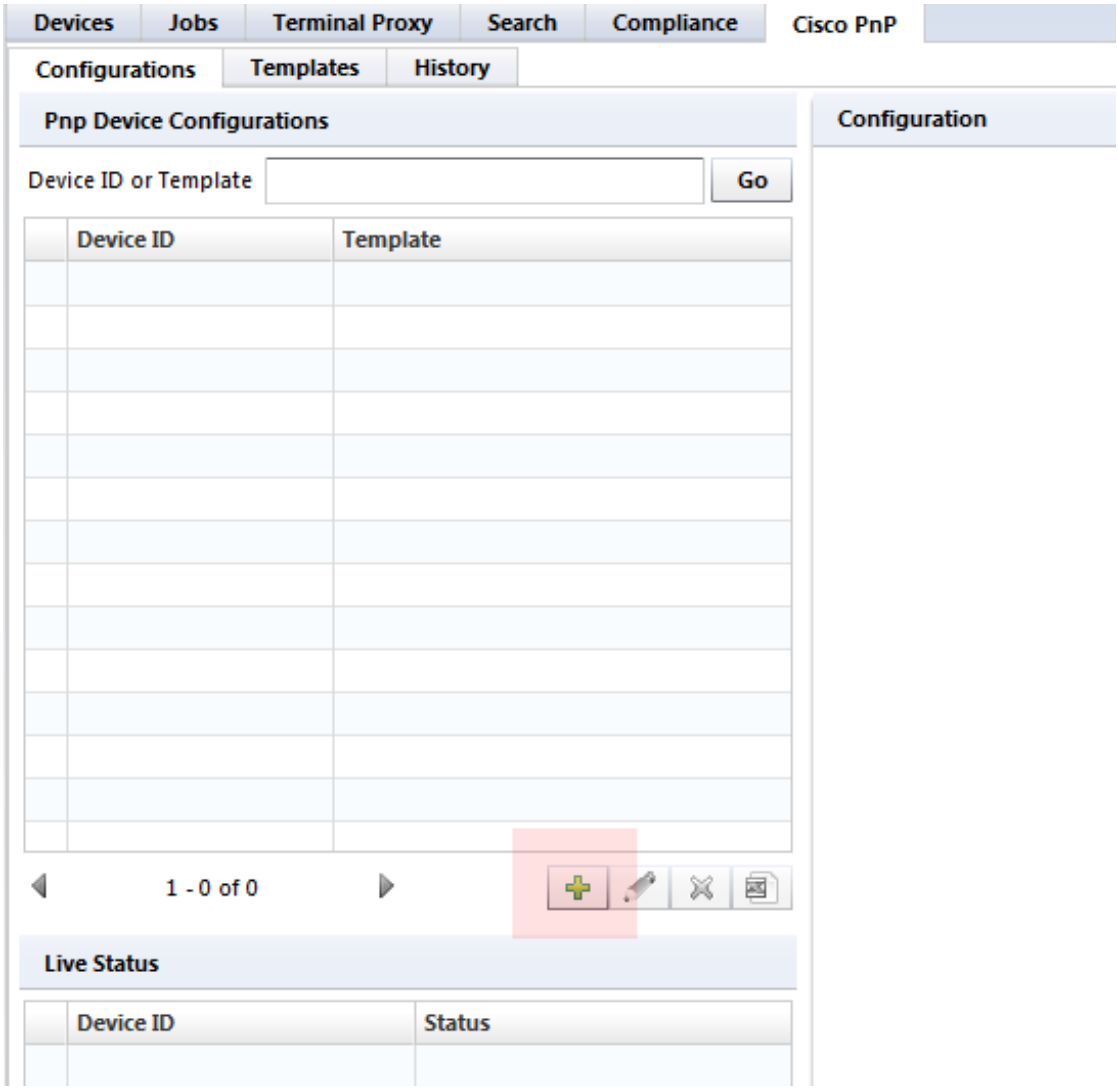
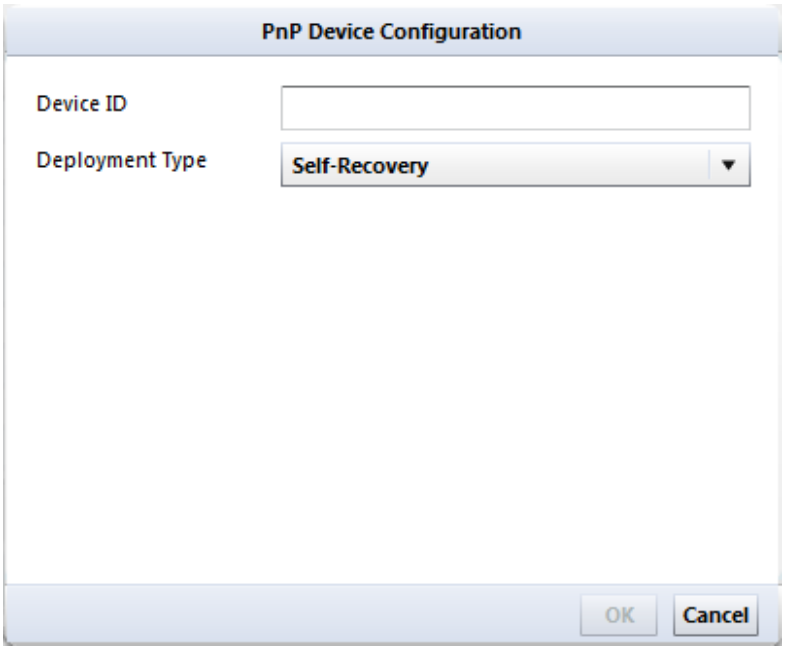
4.2.5 Cisco PnP Self-Recovery

You can recover the configuration that has previously been stored in netLD. This is effective when, for example, the device configuration was erased by mistake. The process is almost the same as using *Template*.

First, move to *Configurations* subtab in the main pane, then click on .



Specify the necessary information in Cisco PnP Device Configuration dialog and click on the OK button. This time, select *Self-Recovery* option for Deployment Type.



After that, the configuration data already stored in netLD is restored back to the device. All remaining processes are the same as in Template-based deployment.

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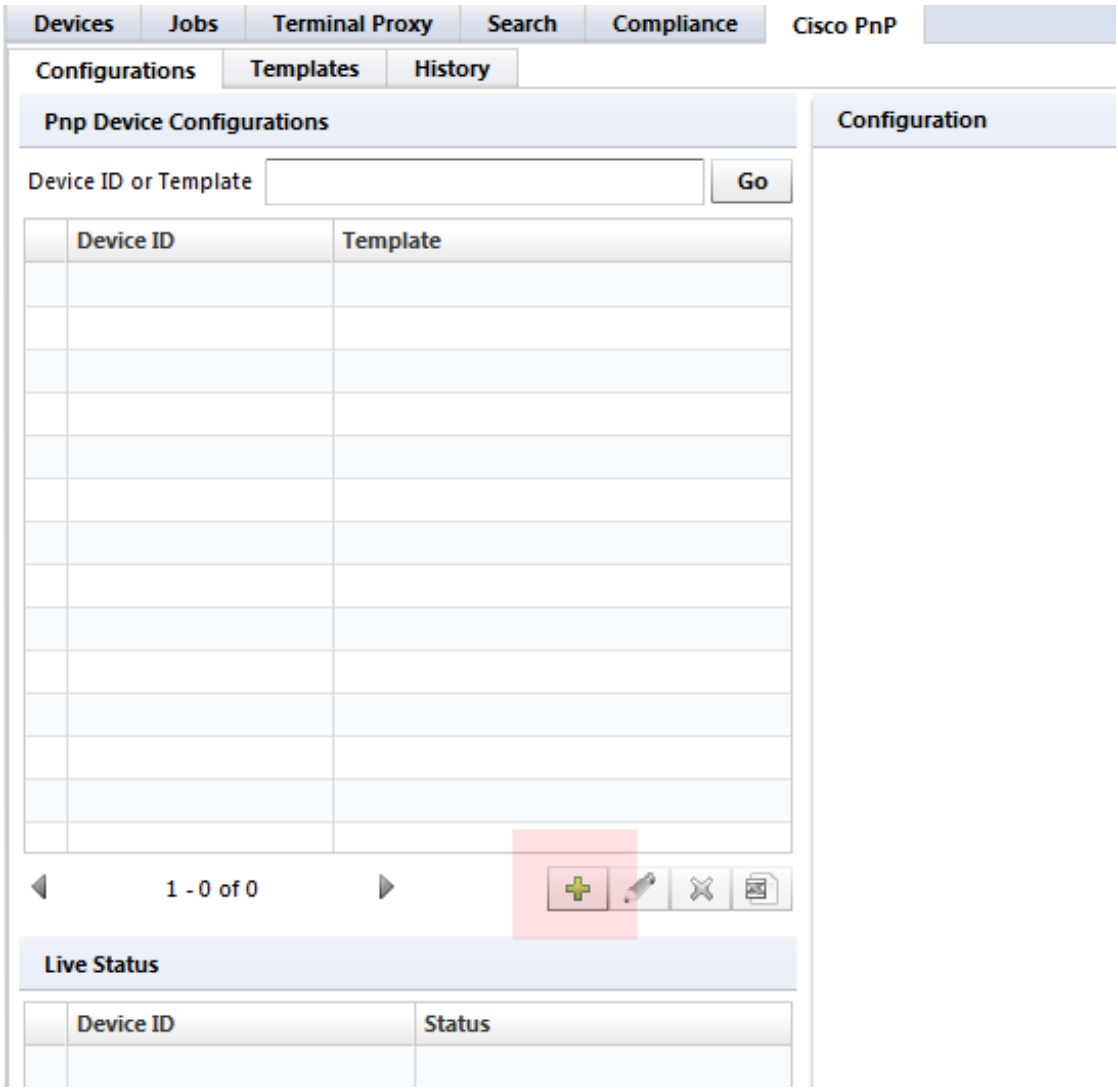
4.2.6 Cisco PnP Specific Device Recovery

This feature configures a new device replaced with a certain old device automatically. If the device is malfunctioning in the network, you just replace the device and run Cisco PnP(zero-touch), then deploy the same configuration as the old one had.

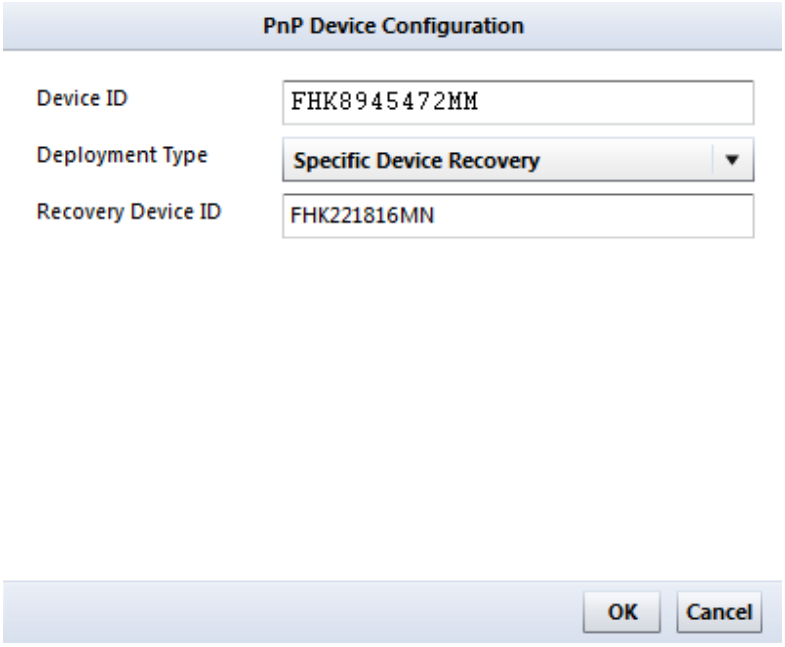
This is quite effective when a device is malfunctioning in a in a remote environment. Assume you cannot actually touch the device (because the site is in a good distance from where you are) and also no one in the data center can deal with the device configuration. With Cisco PnP, you just have to tell someone there to insert the cable into a replacement device by phone, which obviously does not require much knowledge, and you just upload the configuration to the new device remotely.

Again, the processes are almost the same as using *Cisco PnP Template* feature.

First, move to *Configurations* subtab in the main pane, then click on .



Specify the necessary information in Cisco PnP Device Configuration dialog and click on the OK button. Select *Specific Device Recovery* option as a *Deployment Type*.



Menu Items	Description
Recovery Device ID	Similar to Device ID but it should be the ID of the old device.

After that, the configuration data already stored in netLD is restored back to the device. All remaining processes are the same as in Template-based deployment. †[7]

[7] To deploy a configuration from netLD Cisco PnP in a device that will be powered on for the first time, the device must be dispatched by the vendor without `startup-config` in its NVRAM (e.g., CCP-CD-NOCF or CCP-EXPRESS-NOCF option to order devices.)

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4.2.7 Distributing Configurations via 3G network and VPN-capable Mobile Router

netLD is able to distribute configurations via 3G network.

Sometimes, the device to be deployed should be sent to the remote base where various base-level services are not available. For instance, the network is not connected to the World Wide Web. The most reasonable reason is for the security, so the network may be physically disconnected from the Internet, or virtually, via firewall program. And if you are serious about security, you would understand the risk of changing the firewall settings each time the device configurations should be uploaded. Also, you might not gain access to the DNS, DHCP service in that network. Everything might be running on fixed IP tables and there might be no room for additional terminal devices to be inserted into.

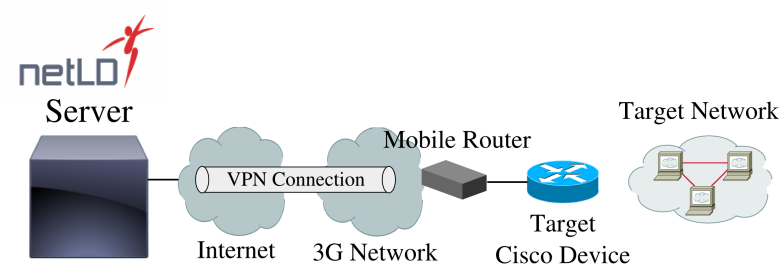
These problems occurs mostly when the target network is not your own but rather a network of your customer, and when you provide a specialized maintenance service to the customer. In these cases, 3G connection is important because if you upload the configuration through it, there is no need to use the network in the remote base.

Other big pros of using 3G network is the following:

- There is no need to set up PPPoE on the remote base thanks to the 3G network.
- Each 3G mobile router is reusable, so the cost of the router per remote base is quite limited.

In the following section, we describe how to set up a 3G-based configuration deployment.

Figure 4.2.7: Concept of 3G-based deployment



1. In Cisco PnP Tab, set up everything needed for the new Cisco device, i.e. setup the configuration templates and register its serial number in the netLD GUI.

2. Power on the mobile router and make a VPN connection from netLD to the data center.

3. Connect a new Cisco device to the mobile router.

4. netLD receives the requests from the Cisco device and distributes the configuration via 3G.

5. Once the deployment is finished, connect the Cisco device to the target network.

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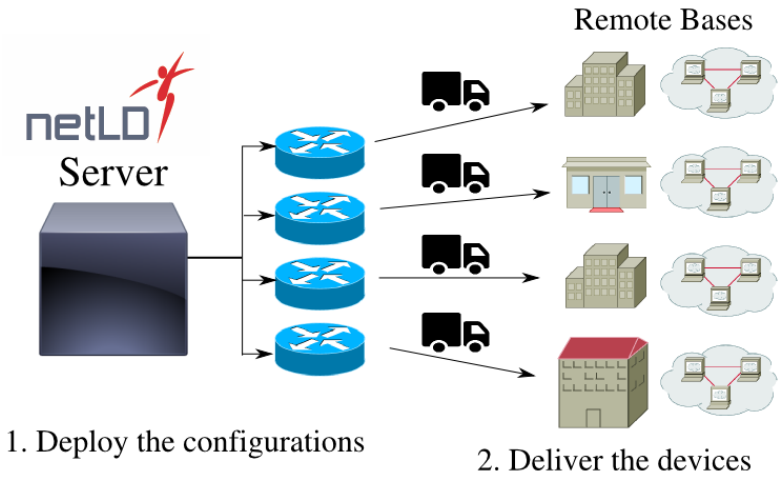
4.2.8 Deploying Configurations Prior to Sending the Devices to Each Base

Another way to deploy devices are using the configure-and-deliver strategy. Just upload the proper configurations with Cisco PnP in your office and send the devices to the remote bases. The pros of this strategy is its simplicity. However, the devices should first be at your office, so you cannot deliver the devices directory from the manufacturer.

Figure 4.2.8: Concept of configure-and-deliver strategy



1. Register the configurations and the serial numbers of the routers to the netLD server.
2. Power on the Cisco devices and distribute the configurations by netLD, in your office.
3. Deliver the devices to each base.

Contact LogicVein Technical Support (support@logicvein.com) and we give the more detailed instruction.

If you need further assistance or technical support about Net LineDancer, please fell free to contact below. We will be pleased to help you when you find any errors or ambiguities in this manual, or any questions regarding them as well. Please note that we are closed on weekends, national holidays, New Year and summer holidays in Japanese time. We accept e-mails for 24 hours but we will only reply on those business hours. Thank you for your cooperation.

LogicVein, Inc. Technical Support

Mail: support@logicvein.com

4.2.9 Deploying a Bootstrap

netLD can deploy the configurations to the devices even when the device is in a network where DHCP is not available, by deploying a bootstrap in advance. The following is an example bootstrap for netLD Cisco PnP. Substitute `<IP>` with the actual IP address of the netLD server. For more information, please contact your distributors.

```
cns id hardware-serial
!
cns connect cns-profile ping-interval 10 retries 3 sleep 5
 discover interface FastEthernet
 template cns-profile
!
cns template connect cns-profile
 cli description Basic CNS Initial Template
 cli ip address dhcp
 cli ip route 0.0.0.0 0.0.0.0 ${interface}
 cli no shutdown
 exit
!
cns config initial <IP> status http://<IP>/cns/config.asp
!
end
```

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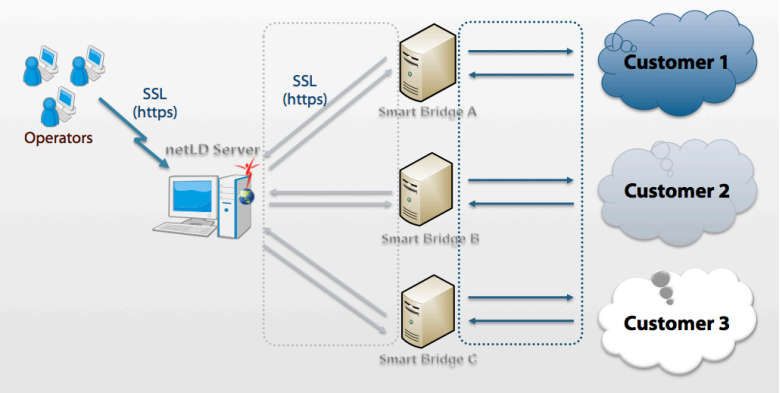
4.3 Smart Bridge (Optional)

netLD Smart Bridge (SB) feature allows you to manage the multiple separate remote networks from a single netLD server. Assume you are managing the devices in the corporation networks of your customers and those local networks do not share the local IP namespace. Without SB you had to set up a new netLD server in each networks, but now you can manage those network via a single terminal!

Figure 4.3.1: Smart Bridge concept



In Sec. 2.5, we described the concepts of *Networks* as a special terms for a device grouping method in netLD. (do not confuse with *network groups* described in Sec. 3.1). The default network is named as *Default* while you can name the other networks as you like. You can also assign privileges to users on those networks.

Each SB-managed remote network is added to the list of networks, and devices in the remote networks are treated as a member of corresponding networks. You can manage those devices by simply switching to that network (through the drop-down menu in the global menu in the top-left corner.)

When you switch to a certain network, the graphical interface is identical to what it used to be - which means any operations described until now is also available in those remote networks, including credentials, access controls (Sec. 2.4) and so on.

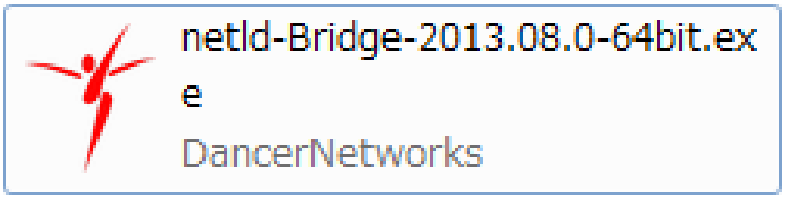
Operating *Smart Bridge* reduces both the CPU workload on the server and the network bandwidth usage. Rather than making one netLD server monitors all devices in one network, you can subdivide a large network into a set of smaller networks and delegate server's task to each *Smart Bridge*. The server only has to manage the result data sent from each SB and the workload on the server decreases. Also, on a system with Smart Bridges, the total amount of data communicated through the global network is significantly reduced because the data sent by each SB consist only of *changes from the previous state*.

In the following sections, we describe how to set up Smart Bridge feature into fully working state.

4.3.1 Installation

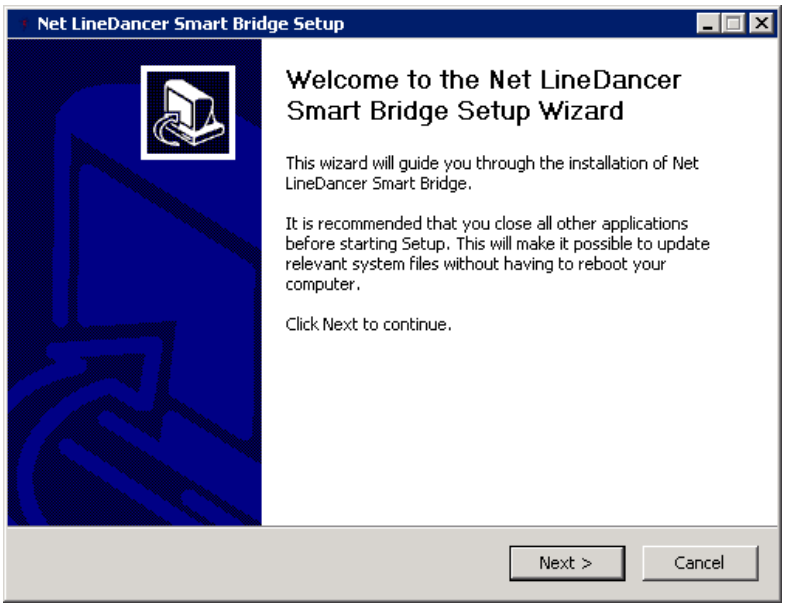
Smart Bridge program is a standalone program that works on the server. You need to install them in each network segment.

Save the netLD Smart Bridge install program (i.e. netld-Bridge-version-32bit or 64bit.exe) to the target server and double-click on the program to start.



Select a language to use from the drop-down menu and click on the OK button to start the Setup wizard.

Click on the Next to go to License Agreement dialog.


Net LineDancer Smart Bridge Setup
Welcome to the Net LineDancer Smart Bridge Setup Wizard
This wizard will guide you through the installation of Net LineDancer Smart Bridge.
It is recommended that you close all other applications before starting Setup. This will make it possible to update relevant system files without having to reboot your computer.
Click Next to continue.
Next >
Cancel

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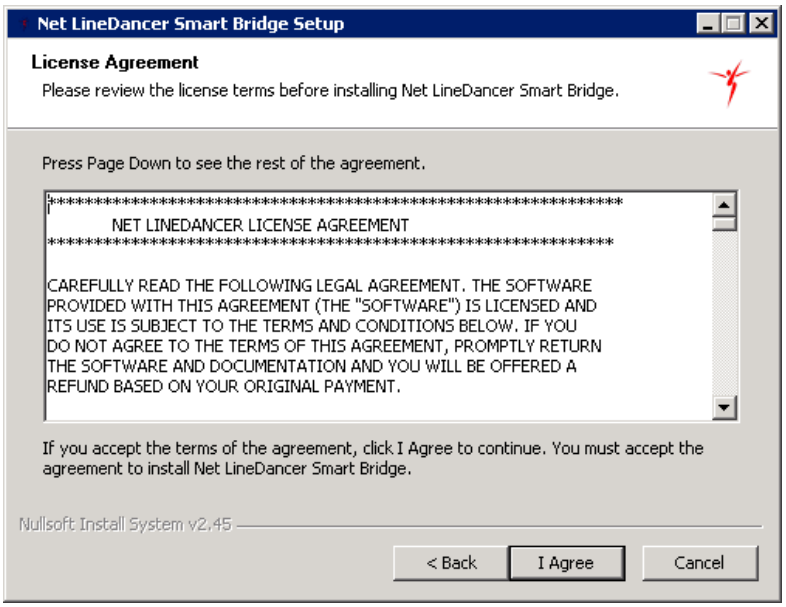
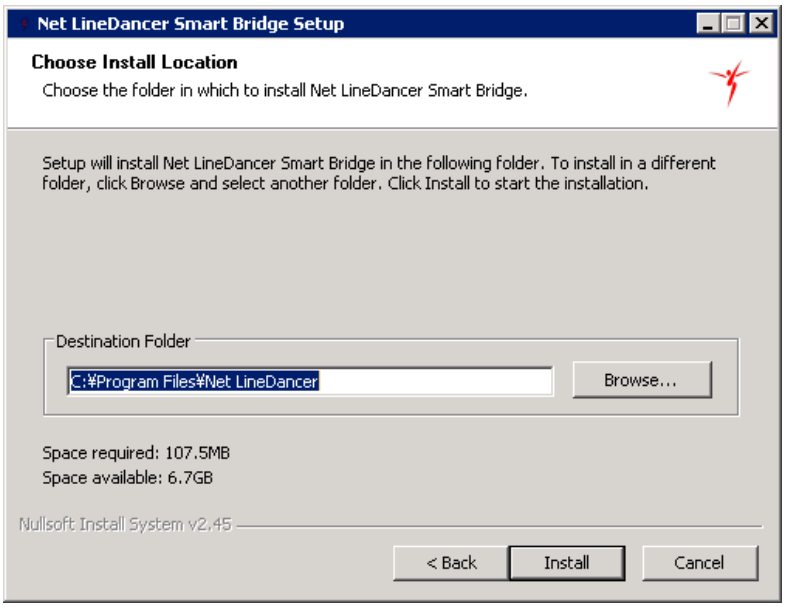
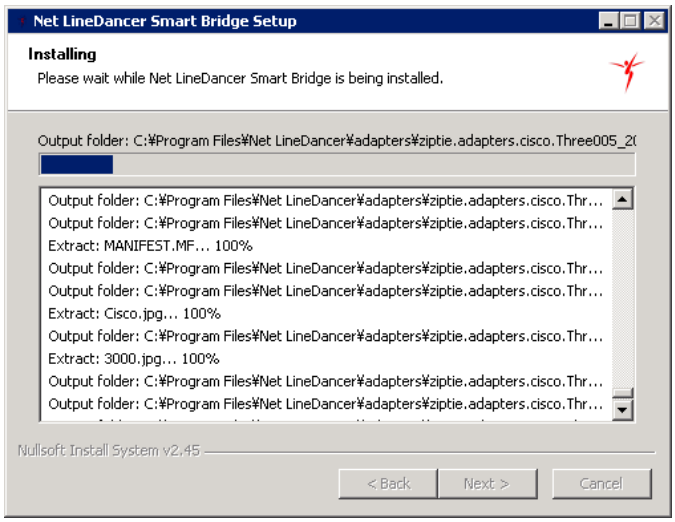
License Agreement dialog. Press page down key to read the rest of the agreement and click on the I Agree to continue.


Net LineDancer Smart Bridge Setup
License Agreement
Please review the license terms before installing Net LineDancer Smart Bridge.
Press Page Down to see the rest of the agreement.
NET LINEDANCER LICENSE AGREEMENT
CAREFULLY READ THE FOLLOWING LEGAL AGREEMENT. THE SOFTWARE
PROVIDED WITH THIS AGREEMENT (THE "SOFTWARE") IS LICENSED AND
ITS USE IS SUBJECT TO THE TERMS AND CONDITIONS BELOW. IF YOU
DO NOT AGREE TO THE TERMS OF THIS AGREEMENT, PROMPTLY RETURN
THE SOFTWARE AND DOCUMENTATION AND YOU WILL BE OFFERED A
REFUND BASED ON YOUR ORIGINAL PAYMENT.
If you accept the terms of the agreement, click I Agree to continue. You must accept the agreement to install Net LineDancer Smart Bridge.
Nullsoft Install System v2.45
< Back
I Agree
Cancel

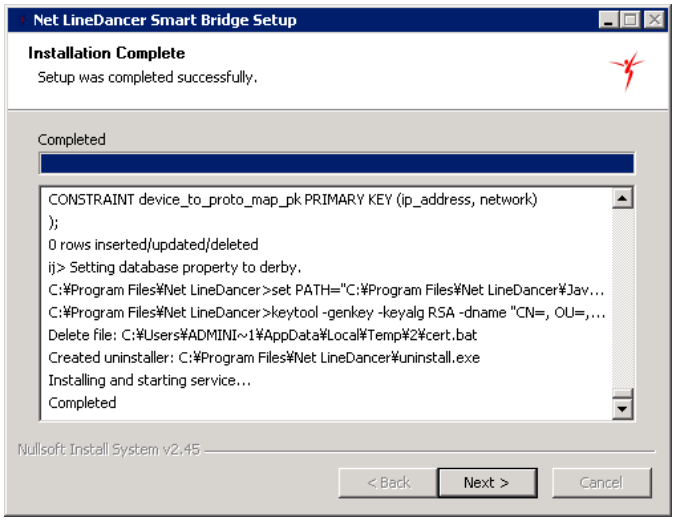
Specify the install directory by clicking on *Browse...* button. Click on the Next button to continue.


Net LineDancer Smart Bridge Setup
Choose Install Location
Choose the folder in which to install Net LineDancer Smart Bridge.
Setup will install Net LineDancer Smart Bridge in the following folder. To install in a different folder, click Browse and select another folder. Click Install to start the installation.
Destination Folder
C:¥Program Files¥Net LineDancer
Browse...
Space required: 107.5MB
Space available: 6.7GB
Nullsoft Install System v2.45
< Back
Install
Cancel

Installation continues.


Net LineDancer Smart Bridge Setup
Installing
Please wait while Net LineDancer Smart Bridge is being installed.
Output folder: C:¥Program Files¥Net LineDancer¥adapters¥ziptie.adapters.cisco.Three005_2(
Output folder: C:¥Program Files¥Net LineDancer¥adapters¥ziptie.adapters.cisco.Thr...
Output folder: C:¥Program Files¥Net LineDancer¥adapters¥ziptie.adapters.cisco.Thr...
Extract: MANIFEST.MF... 100%
Output folder: C:¥Program Files¥Net LineDancer¥adapters¥ziptie.adapters.cisco.Thr...
Output folder: C:¥Program Files¥Net LineDancer¥adapters¥ziptie.adapters.cisco.Thr...
Extract: Cisco.jpg... 100%
Output folder: C:¥Program Files¥Net LineDancer¥adapters¥ziptie.adapters.cisco.Thr...
Extract: 3000.jpg... 100%
Output folder: C:¥Program Files¥Net LineDancer¥adapters¥ziptie.adapters.cisco.Thr...
Output folder: C:¥Program Files¥Net LineDancer¥adapters¥ziptie.adapters.cisco.Thr...
Nullsoft Install System v2,45
< Back
Next >
Cancel

Click on the Next button if Installation Complete dialog is displayed.



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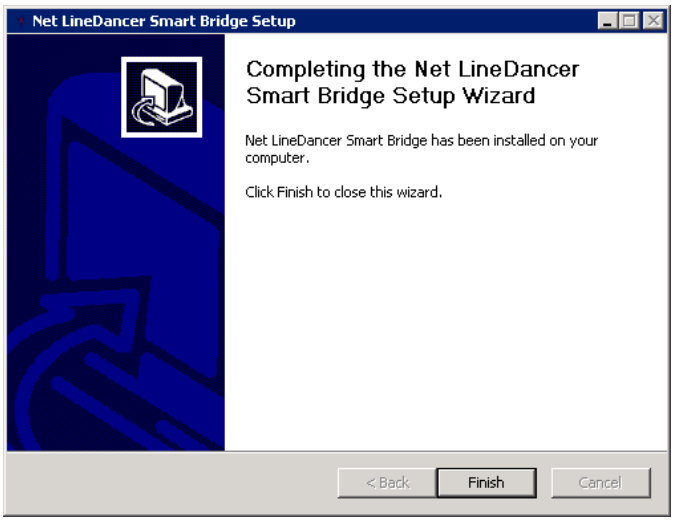
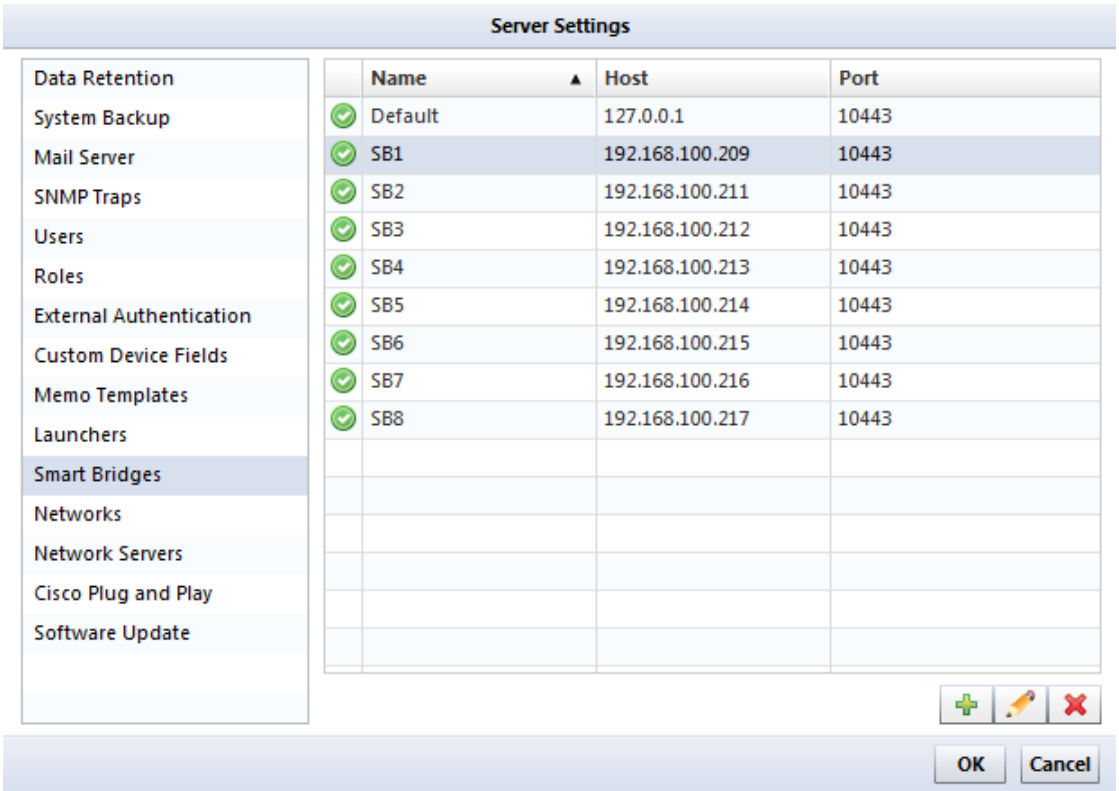
Click on the Finish button to close the setup wizard.


Net LineDancer Smart Bridge Setup
Completing the Net LineDancer Smart Bridge Setup Wizard
Net LineDancer Smart Bridge has been installed on your computer.
Click Finish to close this wizard.
< Back
Finish
Cancel

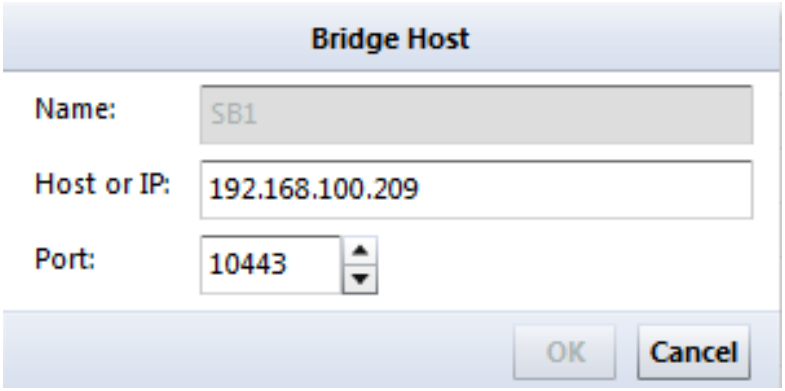
4.3.2 Registering Smart Bridges to the Core Server

You have to register the installed Smart Bridges to the core netLD Server. Go to the *settings window* → *Smart Bridges*.

Click on the .

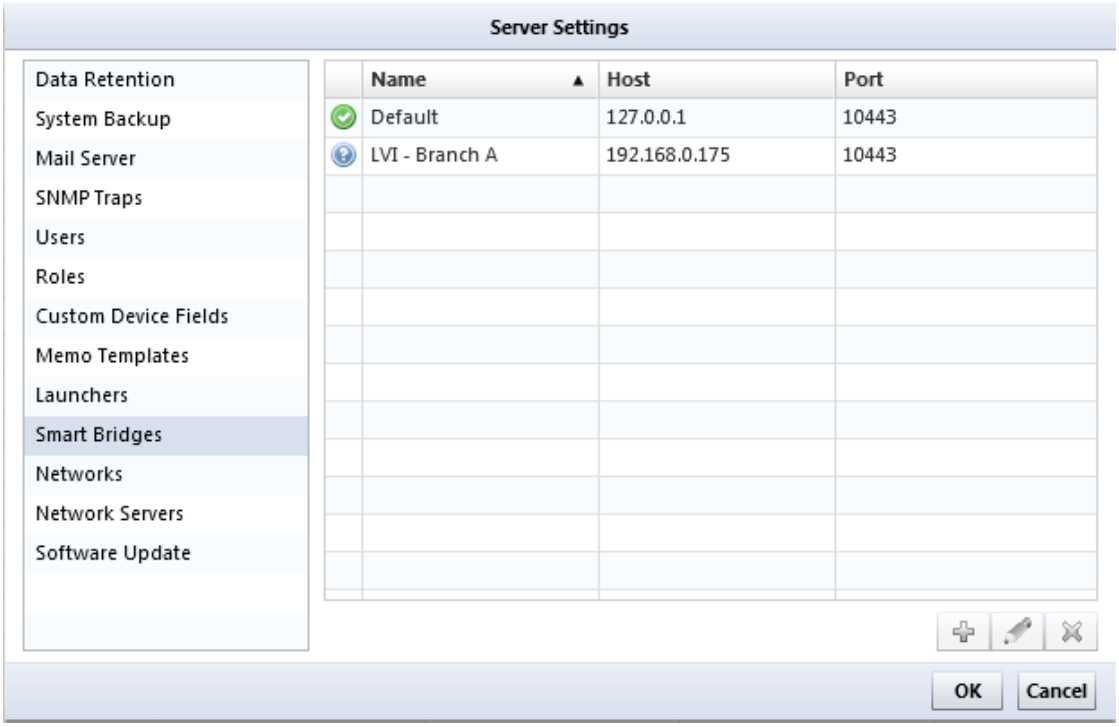


Enter the required information in Bridge Host dialog. Then click on the OK button to finish.



Menu Items	Description
Name	Enter a name for the Smart Bridge.
Host or IP	Specify a server by hostname or IP address that the Smart Bridge is installed.
Port	Specify a port that the Smart Bridge uses by the up and down arrow keys.

Once the Smart Bridge is added to the network list on the core server, you will be soon able to check the connection status to the Smart Bridge in this dialog. The icons in the first column indicates the status of the Smart Bridge. Now, the status is because the connection is not established.



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Sooner or later, if the configuration is correct, the icon should turn into . If it never do so, review the configuration again. If the problem still exists, please contact out support. †[8]

If you need further assistance or technical support about Net LineDancer, please fell free to contact below. We will be pleased to help you when you find any errors or ambiguities in this manual, or any questions regarding them as well. Please note that we are closed on weekends, national holidays, New Year and summer holidays in Japanese time. We accept e-mails for 24 hours but we will only reply on those business hours. Thank you for your cooperation.

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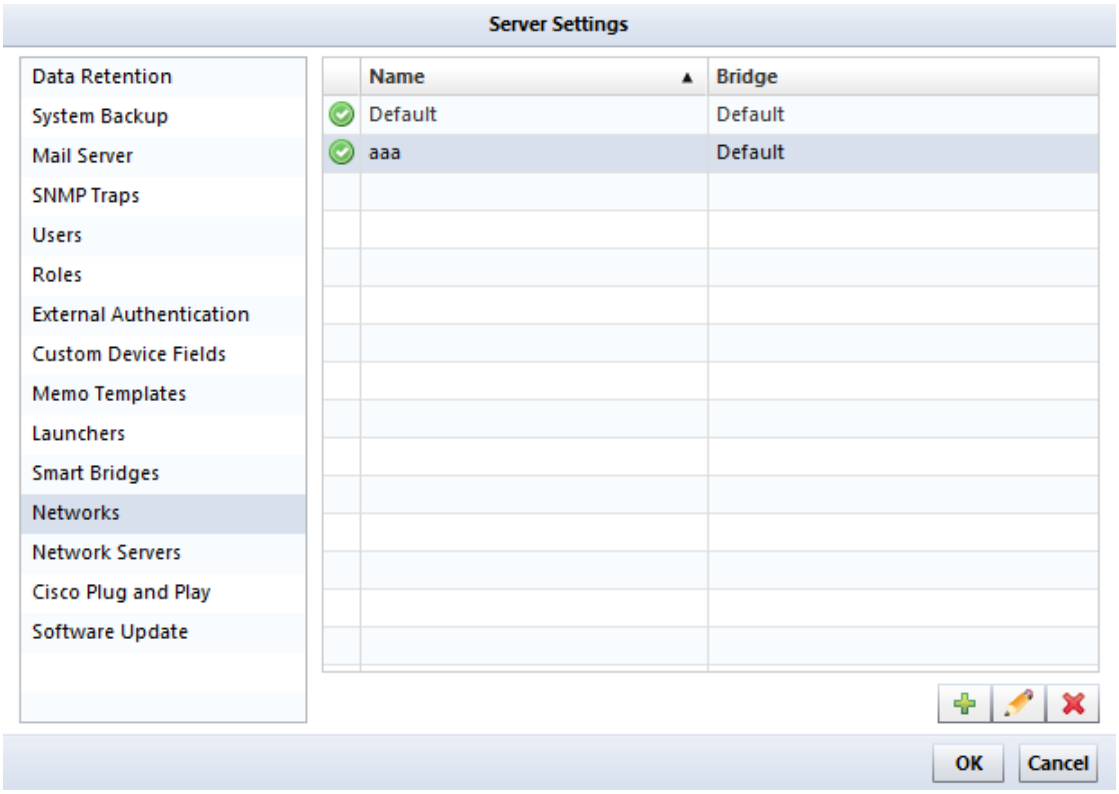
Mail: support@logicvein.com

[8]The name of Smart Bridge cannot be modified after it has been registered in the core server. If you do have to change the name, you have to delete the original one and rerun the entire registration.

4.3.3 Adding a Network for a SB

Adding a network is exactly the same as what you do in order to add a local network, except that you should specify the registered Smart Bridge while adding it. First, Open *Settings window* → *Networks* section.

Click on the to create a new network.



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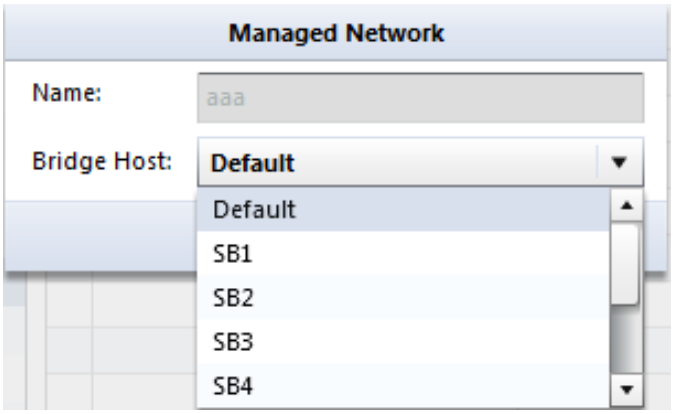
Enter the required information in the dialog. In the *Bridge Host* field, select a SB that you have just added in the previous section. Finally, click on the OK button to save the network.



Menu Items	Description
Name	Enter a name for the new network.
Bridge Host	Select a Smart Bridge to use for the network from the dropdown list.

Once a network is added, it appears in the *Network* dropdown list in the global menu. Selecting its entry switches the network.

4.3.4 Adding devices to a SB

Finally, add devices to the SB network. Again, the manipulation required to add devices, credentials and so on, in the remote network, is nearly exactly the same as those required in the local network.

The only difference is that you have to switch the current network to the target remote newtork which was added in the previous section. Once you have switched to the appropriate network, you can discover, add and change the devices as usual. Credentials can also be handled just the same way as you did. When you add a device, it is polled, checked, backed up by the Smart Bridge, instead of the core netLD server.

For information on adding devices and credentials, see Sec. 3.3.1 and Sec. 3.1.

4.4 Integration with External Network Management Software

In this section, we describe the method to interact with external Network Management Software (NMS) such as SNPMc.

4.4.1 Interaction with SNMPc

After version 10.10 or above, netLD and SNMPc network manager has the improved collaboration. netLD get a device configuration from SNMPc and manages the configuration history. Follow the instructions below, but we assume a windows environment.

First, create a following batch script:

```
----------------------------------------
@echo off
@setlocal
set NETLD_SERVER=*********
set NETWORK=Default
for /f "tokens=1,2 delims=+ " %%a in ("%1") do set DEVICE1=%%a&set
DEVICE2=%%b
@set DEVICE1=%DEVICE1%@%NETWORK%
@set DEVICE2=%DEVICE2%@%NETWORK%
@explorer.exe
"https://%NETLD_SERVER%/#username=*****&password=******&random=%R
ANDOM%&action=diff&device=%DEVICE1%+%DEVICE2%"
exit
----------------------------------------
```

However, please note that:

- `set NETLD_SERVER=********` – fill ***** with the netLD IP address or host name.
- `username=********` – fill ***** with netLD login username.
- `password=********` – fill ***** with netLD login password.

Save this batch script with an arbitrary name like "diff.bat" into SNMPc Network Manager install directory.

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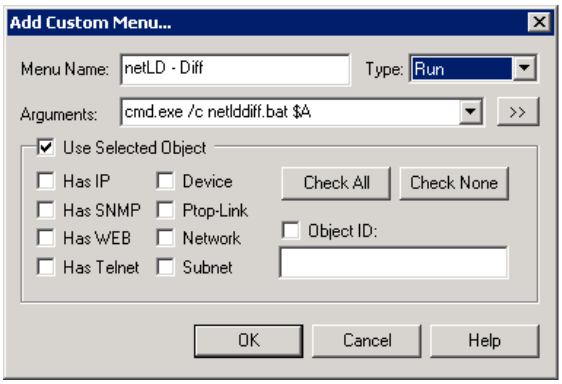
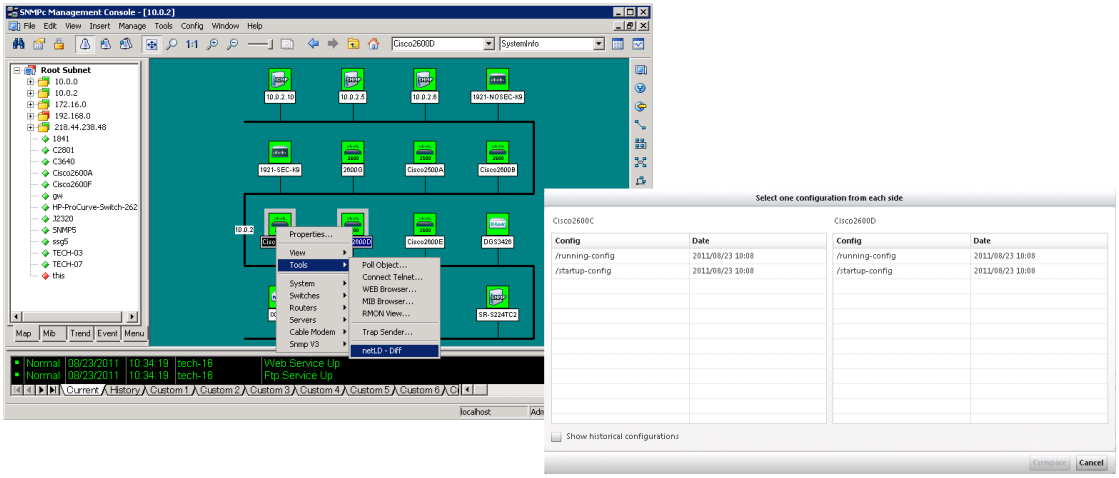
Second, create a custom menu in SNMPc.

Add the following custom menu by selecting *Add Custom Menu* in *Tool* menu. Here is an example of creating a custom menu to use the above batch script. Note that when you fill in the *Argument* field you specify the correct file name that you have saved the batch file as in the previous instruction.

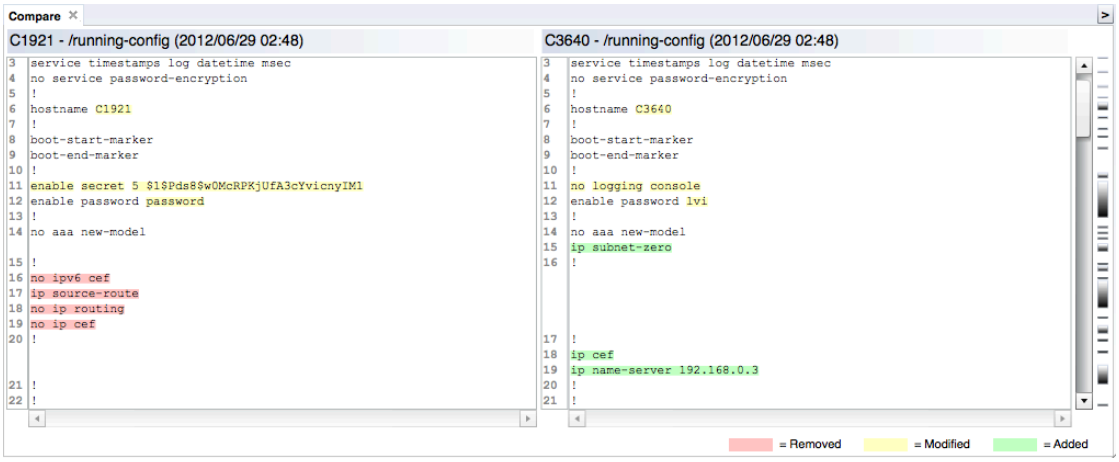
Menu Name	arbitrary
Type	Run
Arguments	`cmd.exe /c diff.bat $A`
Use Selected Object checkbox	Enable



In order to check the menu behavior, select a map object in SNMPc map and click on the new custom menu.



netLD config diff screen opens if any object is selected. If you select two devices, configurations comparison screen of the devices shows up.



[9]

[9]To use this feature, configurations for the devices must already be stored in netLD by performing backup.

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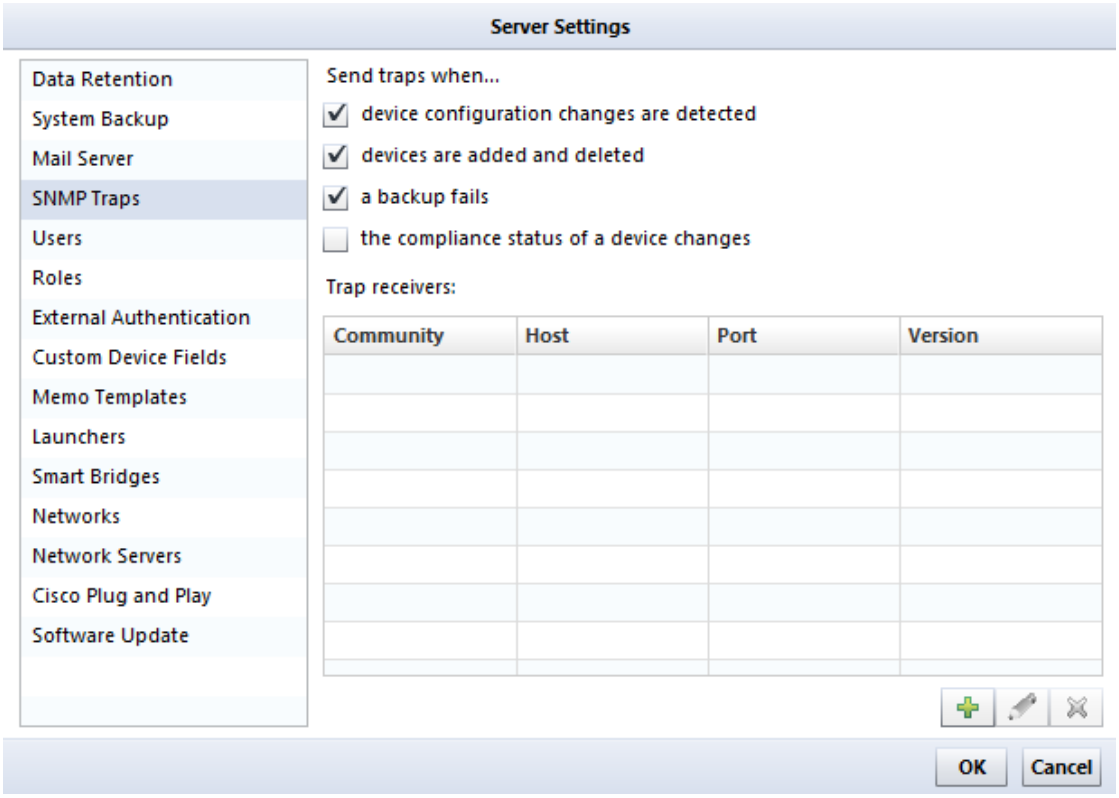
4.4.2 Configuring SNMP Trap Send

netLD is able to send a trap to the network managers when:

1. the device configuration changes[10]
2. a new device was added to/deleted from the netLD inventory
3. netLD fails to run the backup job, and
4. a compliance status changes in some devices.

To set the trap destination, follow the instructions below.

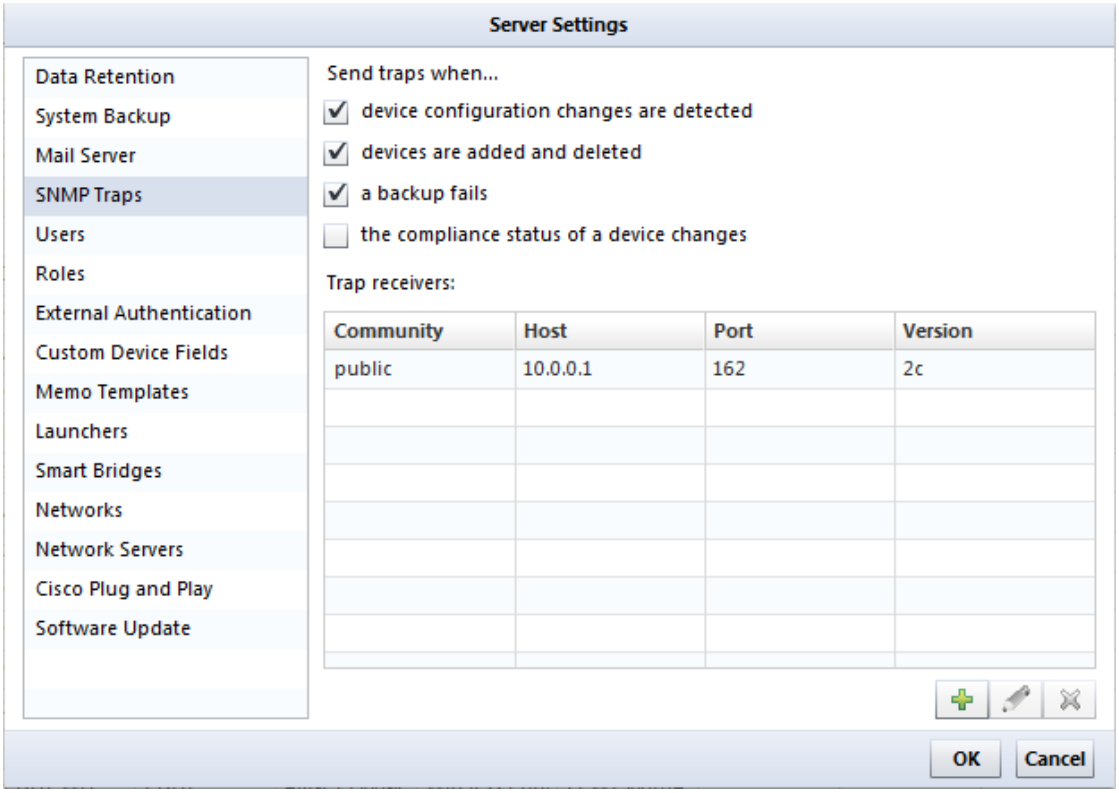
In *Settings window* → *SNMP Traps* enable the checkboxes for the conditions in which netLD sends a trap.



[10] Traps are sent only when the configuration differes from the last backup.

Click on the at the bottom of the Trap receivers list to enter the hostname and the port of the receiver. Also, enter the name of SNMP trap community into *SNMP community string* field. Click on the OK button to add the receiver to the list.

Confirm the receiver is correctly listed in the receivers list and click on the OK button to save the change.



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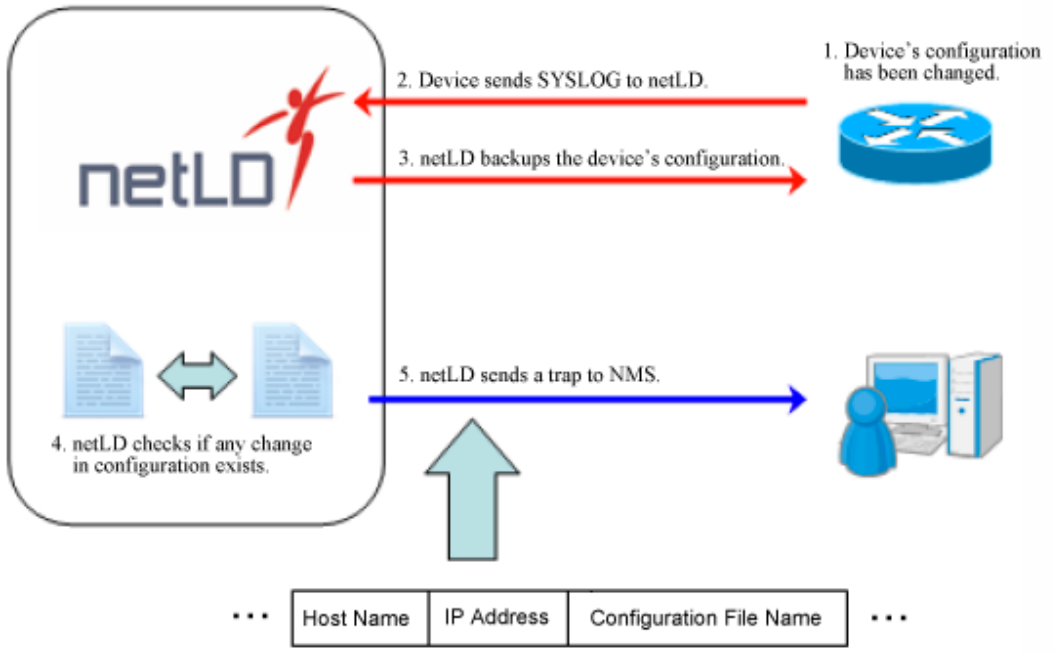
4.5 Real-time Change Detection

netLD is able to detect the configuration changes made outside of netLD and perform a backup in real-time. The change is notified from the device via syslog message.

Figure 4.5.1: Operation Model of Real-time Change Detection


netLD
1. Device's configuration has been changed.
2. Device sends SYSLOG to netLD.
3. netLD backups the device's configuration.
4. netLD checks if any change in configuration exists.
5. netLD sends a trap to NMS.
Host Name
IP Address
Configuration File Name

4.5.1 Configuring your devices

In order to activate this feature, you have to add your netLD server to the device configuration as a syslog recipient. The feature is not available on some devices depending on the vendor and the model of the device. Also, we provide only a limited instruction to the syslog configuration because the syntax in the configuration varies among vendors. Please contact the device vendors for further assistance.

Note that if there is another syslog server in your network it might interfere the logging command sent to netLD server. Contact `LogicVein Technical Support` for more details for locating an external syslog server.

Also, if your devices are not able to emit syslog messages, you have to set up a syslog server manually and independently. In this case too, please contact us through support@logicvein.com.

Now, following examples show the syslog configuration on Cisco and Yamaha devices, where The IP address of netLD server is 192.168.0.10 .

Cisco 2500

```
Router# configure terminal
Router(config)# logging 192.168.0.10
Router(config)# logging on
Router(config)# exit
```

Yamaha RT107

```
Yamaha# syslog host 192.168.0.10
Yamaha# syslog info on
Yamaha# save
```

4.5.2 Operation Check

Check netLD server log real-time events to test operations of this feature. netLD Server log files are saved in netLD install directory with a name `netLD.log`. When a change is detected, the following entry is added:

```
10:35:57 [RealtimeProvider] [Jetty-1] INFO - Added device 10.0.0.152 to real-time batch.
```

If no such entry is found, check another syslog log file (normally `syslog.log` in the same directory) to see if it is receiving any messages from the device.

Again, note that this feature is not available on some devices. It is either due to the hardware limitation, or because the device is the latest model. However, in the latter case, a future support is possible if the device has a specific login and logout events, or a syslog event for configuration change. For this kind of feature-request, contact LogicVein Technical Support (support@logicvein.com).

If you need further assistance or technical support about Net LineDancer, please fell free to contact below. We will be pleased to help you when you find any errors or ambiguities in this manual, or any questions regarding them as well. Please note that we are closed on weekends, national holidays, New Year and summer holidays in Japanese time. We accept e-mails for 24 hours but we will only reply on those business hours. Thank you for your cooperation.

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Chapter 5

Miscellaneous

In this chapter, we describe various tips that help fine-tune the interface and the security. We also include some features that are not used so often but are sometimes essentials.

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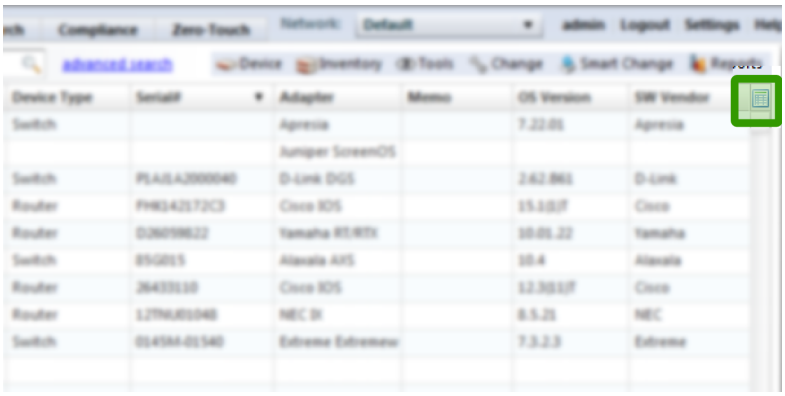
5.1 Configurations Related to Devices and Operations

5.1.1 Modifying the Columns in the Device View

To modify the columns in the Device View, click on the top-right *Select columns* button ( ). The *Customization* dialog show up, so toggle each entry appropriately.

Click on the button.



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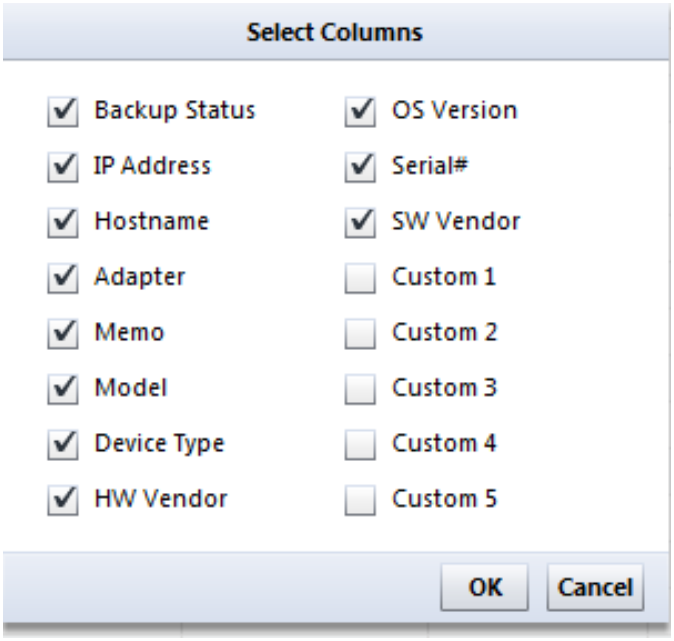
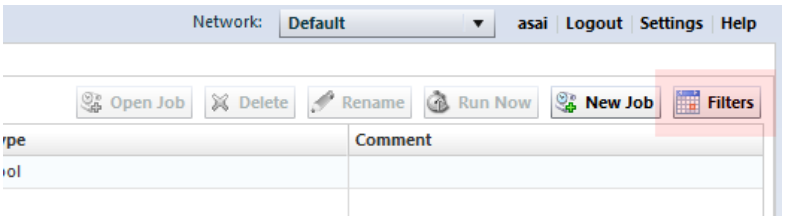
Toggle the checkboxes.



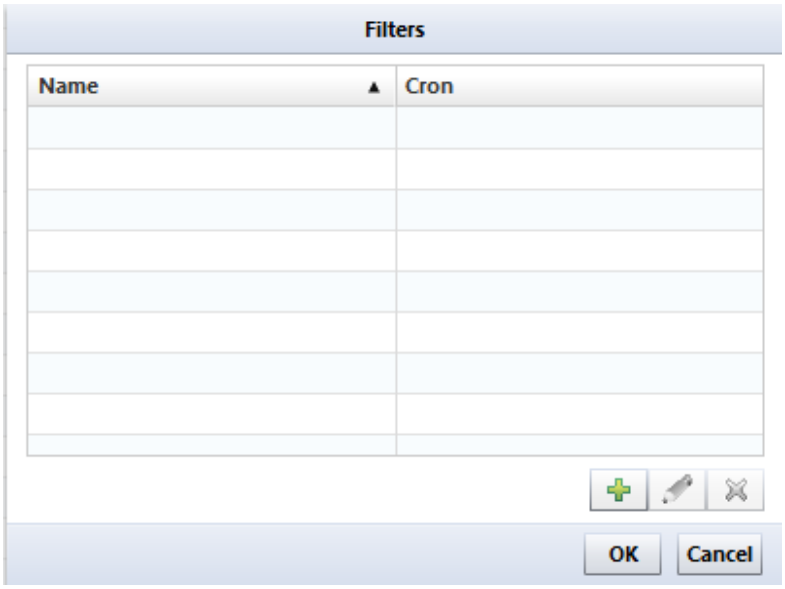
5.1.2 Scheduler Filters

You can use cron expression filters to set regular-basis job schedules. Added filters can be reused afterward while making a job schedule.

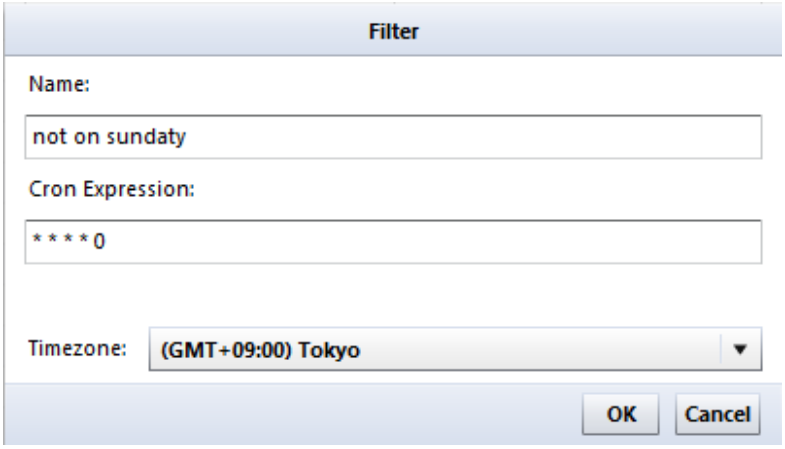
Select *Job Management* → *Filters*.



Click on to create a filter.



Enter the required information. Click on the OK button to save the filter.



Field title	Description
Name	Enter a meaningful filter name.
Cron Expression	Enter a cron expression.
Timezone	Select the timezone to calculate the event triggering time.

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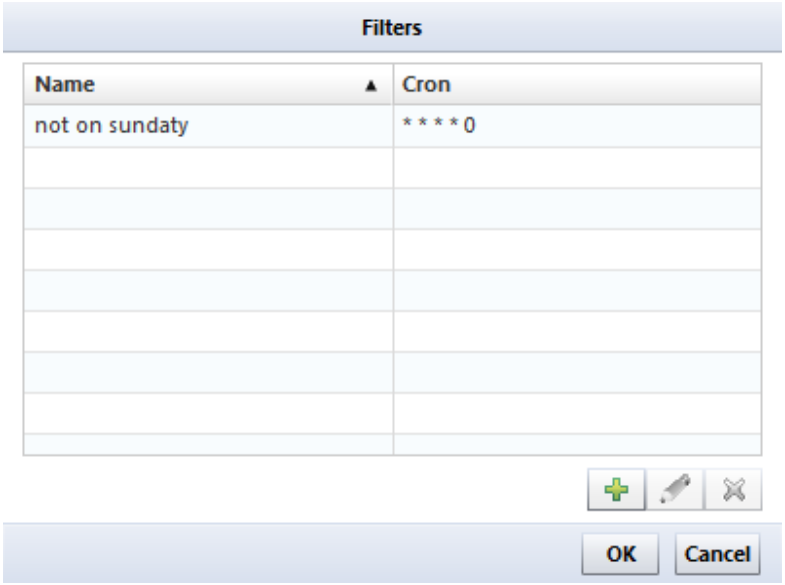
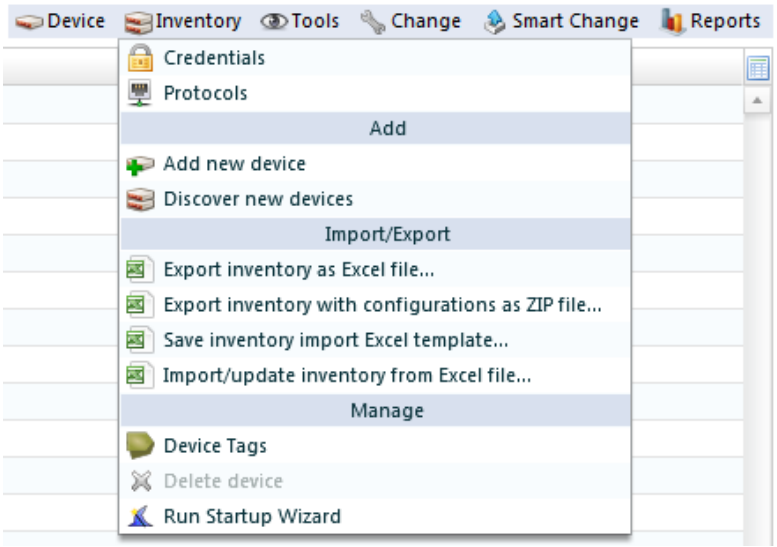
Confirm if the new filter is added and click on the OK button to finish.



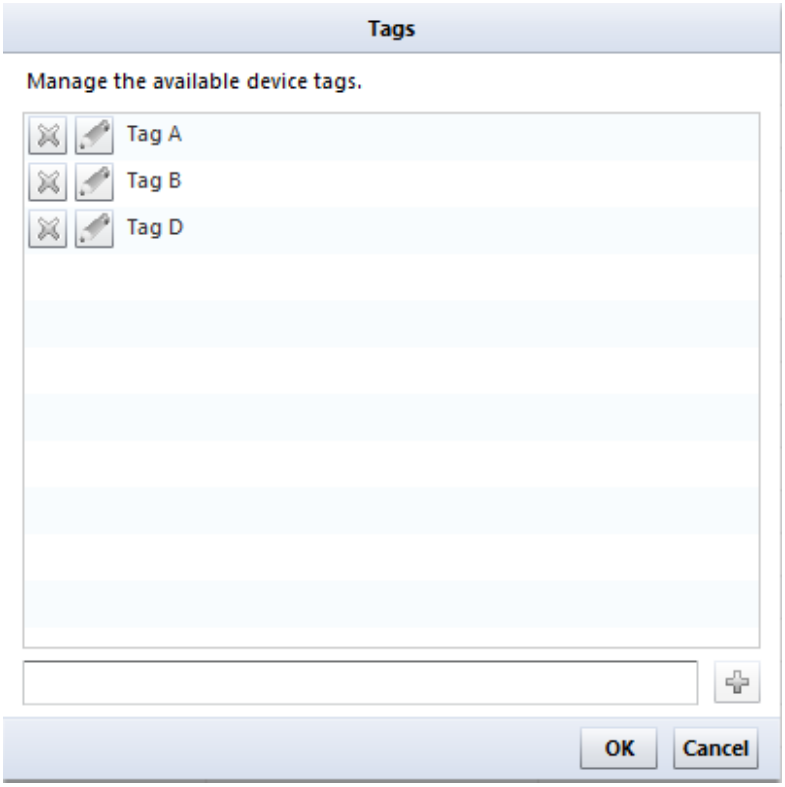
5.1.3 Device Tags

You can group devices in netLD inventory by creating tags for each group. Device Tags can be used while searching the devices.

Open *Inventory* → *Device Tags* menu.

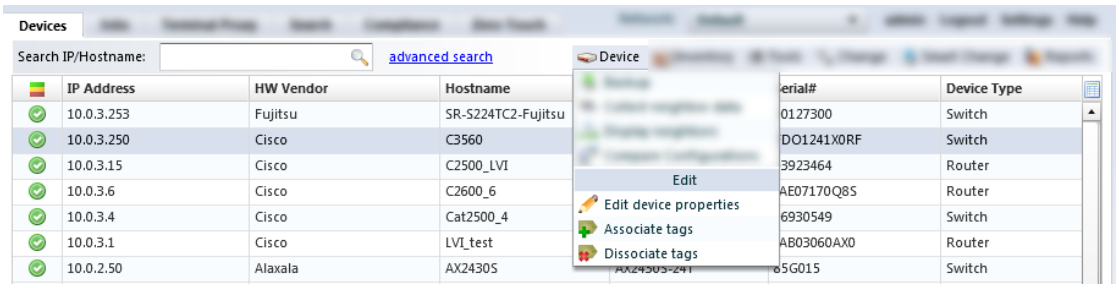


Enter a name for the tag and click on .



Icons	Description
	Click on this icon to delete the tag.
	Click on this icon or double-click on a tag name in the list to edit the tag.

Select devices in Device View and click on the *Associate Tag* or *Disassociate tags* buttons in the Device tool bar.



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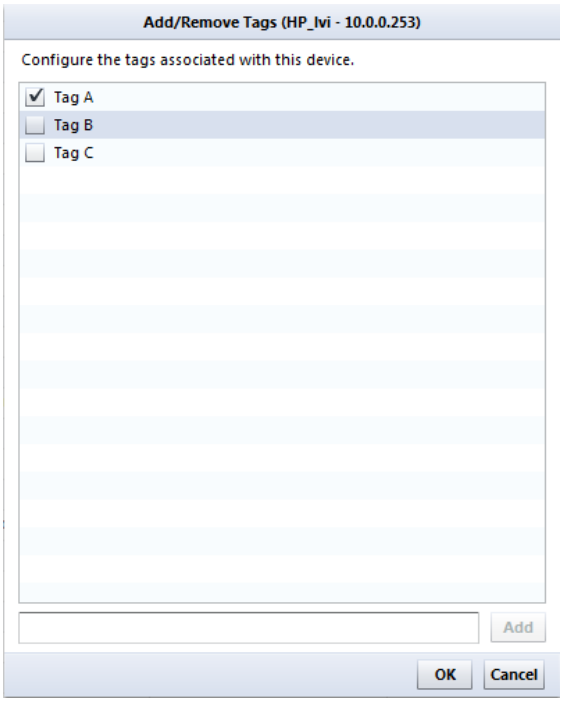
Enable checkboxes for each device tag to associate it with the devices, or leave checkbox empty (disassociate).



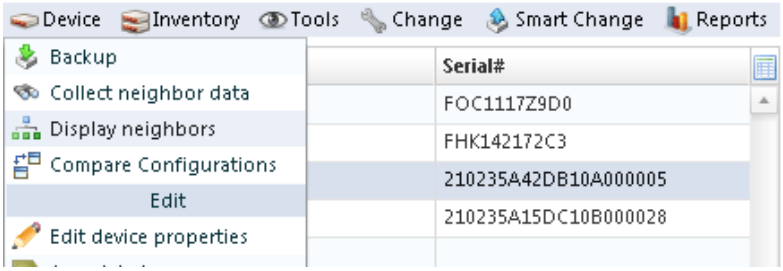
If you are selecting more than one device, tags shared by those devices are displayed in the list. Finally, click on the OK button to save the change.

Tag Devices
Check the tags that you wish to associate with the devices. On the right is the list of tags that the selected devices already share.
Tags to add:
Shared tags:
Tag A
Tag D
Tag B
Add
OK
Cancel

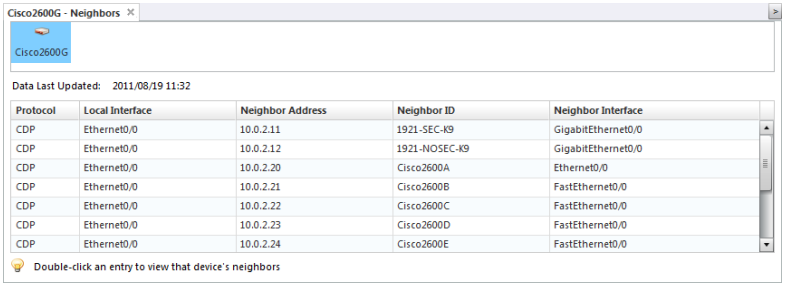
5.1.4 Display Neighbor Information

netLD allows you to check the neighbor information of the device via *Display neighbors* in Device menu.

Select *Device* → *Display neighbors*.



The new tab appears in the status pane.


Cisco2600G - Neighbors
Cisco2600G
Data Last Updated: 2011/08/19 11:32
Protocol | Local Interface | Neighbor Address | Neighbor ID | Neighbor Interface
CDP | Ethernet0/0 | 10.0.2.11 | 1921-SEC-K9 | GigabitEthernet0/0
CDP | Ethernet0/0 | 10.0.2.12 | 1921-NOSEC-K9 | GigabitEthernet0/0
CDP | Ethernet0/0 | 10.0.2.20 | Cisco2600A | Ethernet0/0
CDP | Ethernet0/0 | 10.0.2.21 | Cisco2600B | FastEthernet0/0
CDP | Ethernet0/0 | 10.0.2.22 | Cisco2600C | FastEthernet0/0
CDP | Ethernet0/0 | 10.0.2.23 | Cisco2600D | FastEthernet0/0
CDP | Ethernet0/0 | 10.0.2.24 | Cisco2600E | FastEthernet0/0
Double-click an entry to view that device's neighbors

5.2 Configurations Available in Settings Window

In this section, we describe the configurations available in *(Server) Settings* window. It opens when you click on the *settings* button on the global menu.

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5.2.1 Setting the Data Retention policy

netLD stores all configuration data unless specified. However, it causes the size of the database to increase in the long run. You can set an expiration period of the data to avoid this problem. The configuration is available in *Data Retention* menu.

In *Delete expired data weekly at this time*, you can configure which timing you want to remove the old data. The rest determines just as it says:

- Duration to keep configuration history
- Duration to keep terminal proxy history
- Duration to keep job execution history

5.2.2 System Backup and Restoration

All netLD internal data are saved in `derby` and `lucene` subdirectories (and also `pgsql` after version 14.06) under the netLD installation directory. netLD provides a convenient backup & restoration feature for those configurations. System backups can be scheduled and runs automatically. †[2]

In System Backup settings, you can modify the following contents:

Menu Items	Description
Enable daily system backup	Enable this checkbox to enable daily system backup.
Perform the system backup at this time	Specify the time to perform the system backup.
Number of backups to keep	Specify the number of backups (7, 14, and 30) to keep in the local server.
Backup directory	Specify a name of the directory that the back up files should be saved.
Perform System Backup Now	Click on this button to execute a system backup.
System backup last performed	Shows the date and time last system backup was performed.

Backup data will be saved in a directory named `backup_yyyy-mm-dd`, where `yyyy,mm,dd` corresponds to year, month and date, respectively. The default directory is `<installdir>/backups`, but you can also save the backup into the other path (e.g. D:￥backups). Backup data can be saved only in the local disks.

[1]The latest configuration is always kept even if it is older than the duration setting.
[2]These settings are independent of the backup schedule for the device configuration.

Figure 5.2.1: Data Retention settings menu

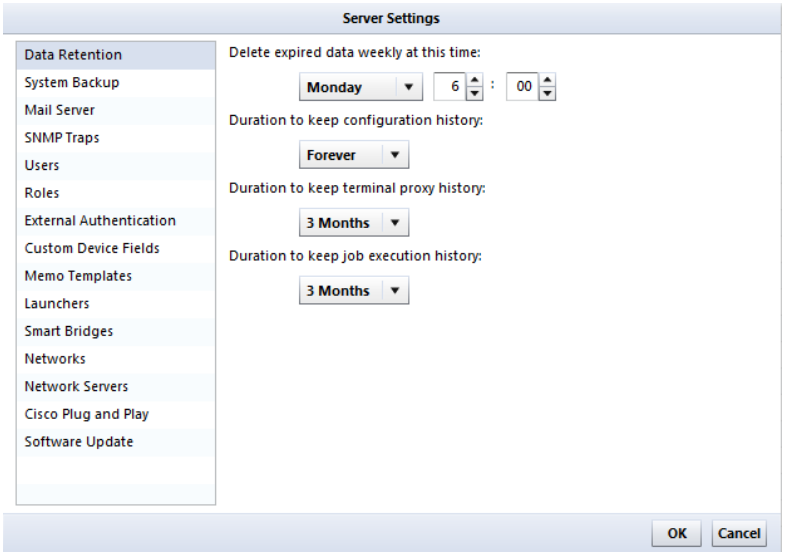
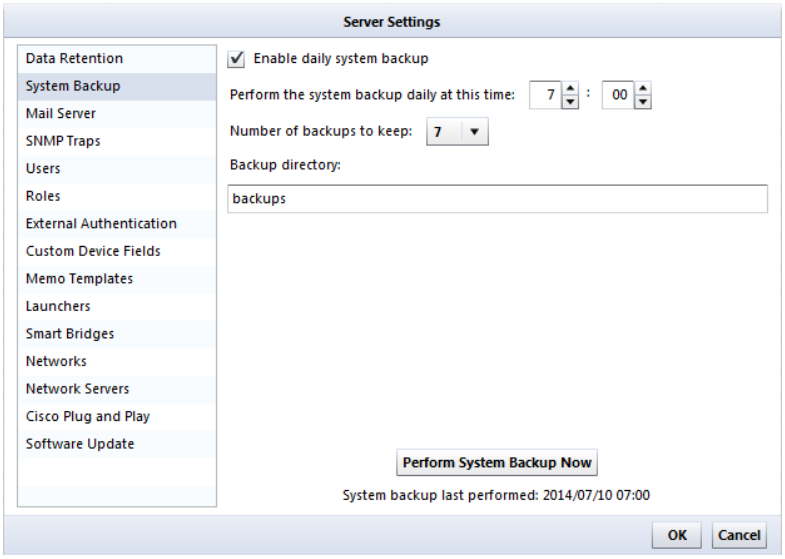


Figure 5.2.2: System Backup settings menu



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Restoring the Backup Data

Note that there is no compatibility of the saved data between the different versions of netLD. This is usually not a problem because, when netLD is upgraded to a new version and it has some backup data, they are automatically migrated to the new version.

The problem occurs when you move or store the saved data manually. One such situation is when you want to migrate the settings to the new machine. In this case, you should be careful about the compatibility.

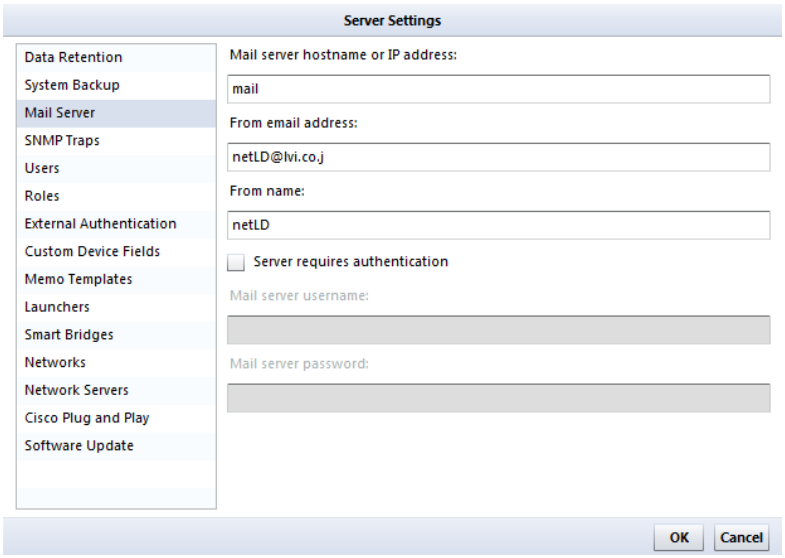
To migrate the setting data manually, follow the instruction below:

1. Stop the running netLD service in the new and the old servers.
2. Copy `derby` and `lucene` (and `pgsql` after version 14.06) subdirectories (cf. Sec. 7.2, p.231) from the old server and save them into the netLD install directory of the new server.
3. Start netLD service in the new server.

5.2.3 Mail Server

You can set an SMTP server to allow netLD to send E-mails. Following configurations are available.

Figure 5.2.3: *Mail Server* section in *settings* window



Menu Items	Description
Mail server hostname or IP address	The mail server by hostname or IP address.
From email address	The sender email address.
From name	The sender name.
Server requires authentication	Enables the server authentication.
Mail server username	Mail server username for the authentication.
Mail server password	Mail server password for the authentication.

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5.2.4 Changing the Data Directory in Operation

You can customize not only the backup directory but also the current setting directories, while it requires some amount of operations.

1. Stop the running netLD service (via CLI, Service Manager or Task Tray. see Sec. 2.6)
2. Copy `derby` and `lucene` subdirectories (cf. Sec. 7.2, p.231) to the destination directory, `E://nlddata` for example.
3. Open `Net LineDancer￥osgi-config￥config.ini` and find the following line:

   ```
   netld.datadir=
   ```

   Append the destination directory path to the line:

   ```
   netld.datadir=E://nlddata
   ```

4. Start netLD service in CLI. (e.g., `net start netld`)

5.2.5 netLD RADIUS External Authentication

netLD provides the ability for users to be authenticated using an external Remote Access Dial In User Service (RADIUS) server. This guide will explain how to configure netLD to enable this integration.

Requirements

In order to run the RADIUS integration you must have a RADIUS capable server like Microsoft Active Directory or FreeRADIUS. The netLD server and RADIUS server must also be able to communicate using UDP on port 1812.

Configuring RADIUS

In order for netLD to be able to authenticate, the RADIUS server only needs to be configured to handle Access-Request packets. After sending an Access-Request to the RADIUS server, netLD will listen for an Access-Accept response. The response should contain one or more Filter-Id attributes.

Here is an example configuration for a user named "jdoe" in FreeRADIUS...

```
yamada Cleartext-Password := "password"
       Filter-Id += "role:Administrator",
       Filter-Id += "networks:*",
       Filter-Id += "customFields:1,2,3,4,5"
```

This configuration tells FreeRADIUS that for an *Access-Request* for a user named "jdoe" to match the password "password". If the password matches an *Access-Accept* response will be sent with three Filter-Id attributes set. These three Filter-Id attributes control the access the user is granted.

Name	Required	Description
role	Yes	The name of the netLD role to assign to this user.
networks	No	A comma separated list of the managed networks visible to the user. (Use "*" to grant access to all networks)
customFields	No	A comma separated list of the custom fields that should be visible to the user.

Configuring Net LineDancer

To configure RADIUS authentication you must tell netLD the hostname and shared secret for communicating with your RADIUS server. The RADIUS configuration settings can be found in the *Server Settings* window.

Here you can enter the hostname or IP address of the RADIUS server and the shared secret to use when making requests. You can test if the settings are correct by entering a test username and password into the *Test Authentication* area. Clicking the *Test* button will cause netLD to attempt an *Access-Request* against the specified server.

To enable the RADIUS integration check *Allow authentication using an external RADIUS server* and click on *OK*.

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5.2.6 Changing the Column Names of Custom Device Fields

You can add arbitrary texts in the custom fields of the devices. In order to modify the value of custom field in each device, see Sec. 3.3.4. In this setting section, you can customize the titles of *Custom Device Fields*.

5.2.7 Launchers (URL Launchers)

In this setting section, you can create shortcuts to access certain URLs defined by the device in the right-click menu which appears in the inventory.

If you set a *URL Launcher* template (`IP Address` for example), an `IP Address` button appears in the right-click menu in *Device View*. When you click on it, the template is instantiated with the device information, and the browser opens the result URL.

To add such a launcher, click on to insert the entry to the list. The URL may contain some specific patterns surrounded with braces {} which are substituted with the actual value of each device.

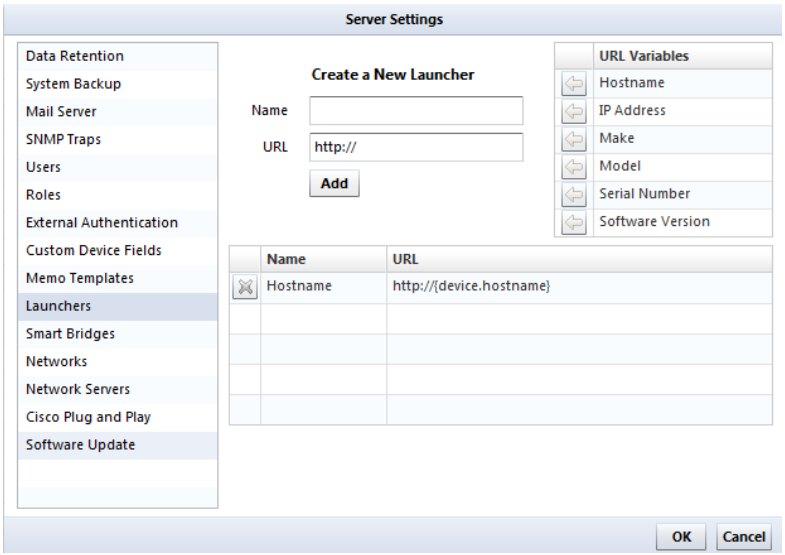


Figure 5.2.4: External Authentication section in *Server Settings* window.

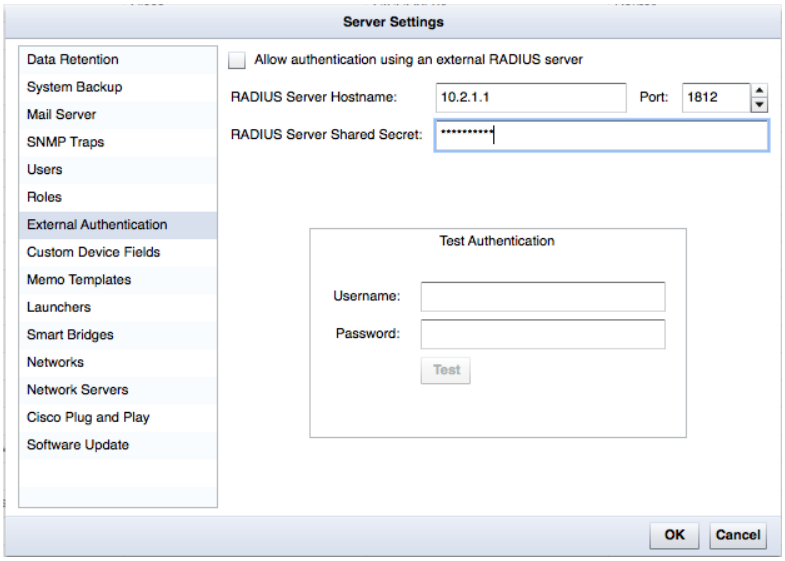
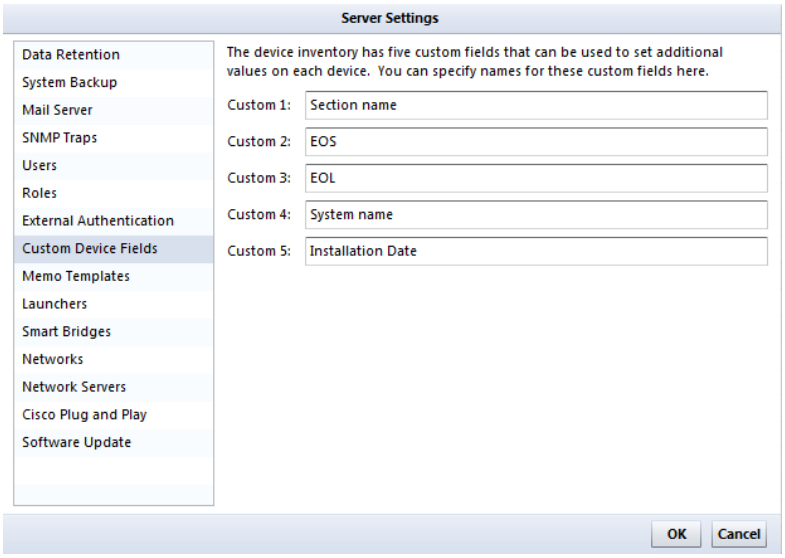


Figure 5.2.5: Custom Device Fields



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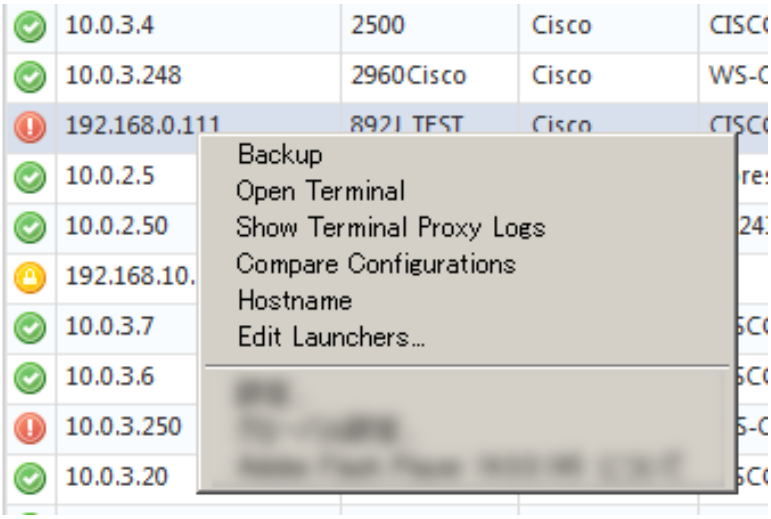
For example, if you right-click on a device with IP `10.0.0.1` and click on the new entry `IP Address` added in the right-click menu, a pattern `{device.ipAddress}` in the URL of that entry is substituted with an actual IP address `10.0.0.1`. Those patterns are added via ← buttons in URL Variables.



5.2.8 Network Servers

In Network Servers, you can modify the settings for Login Idle Timeout and Server Primary IP Address.

Login Idle Timeout

Login idle timeout for netLD console is set to 30 minutes by default. You can change it in the *Network Servers*. Follow the instruction below.

Disabling this feature is not available because it is a bad practice with regard to the security. If someone get the configuration data while an administrator is leaving his desk for a while, it causes a serious system abuse. However, if you really want to do it, you are still able to achieve virtually the same results by setting the maximum value (526,000).

To change the value, change the number of minutes in *User login idle timeout (minutes)* dial box. Click on the OK button to save the value.

Figure 5.2.6: URL Launchers

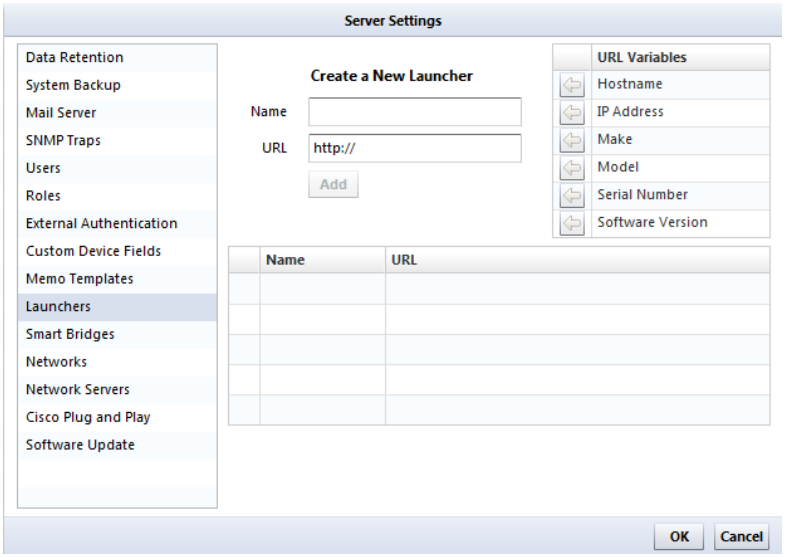
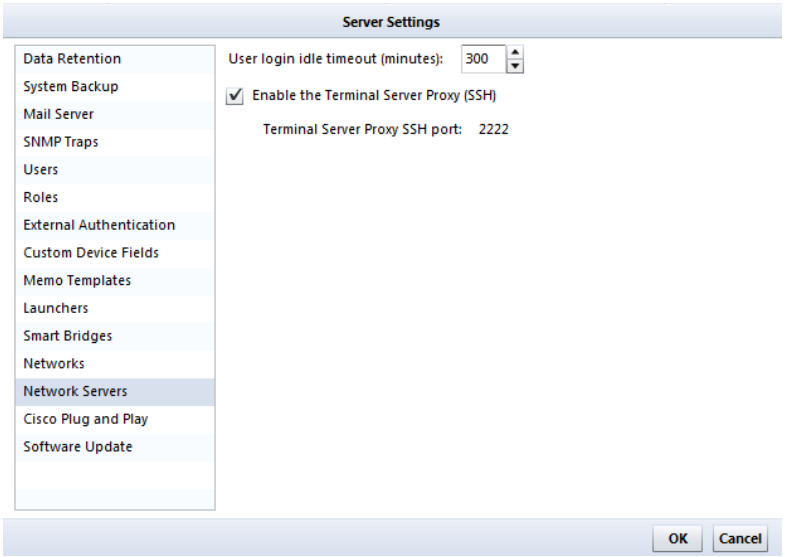


Figure 5.2.7: Network Servers



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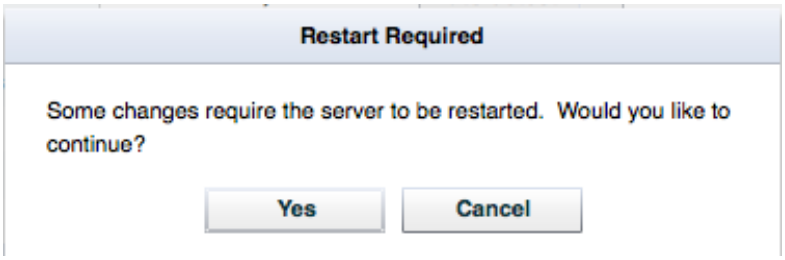
Changing the Server Primary IP Address (Windows version only)

netLD primary server IP address will be automatically detected when the program is launched. To change the value, use *Server Primary IP Address* pull down list to change the IP address and click on the OK button.

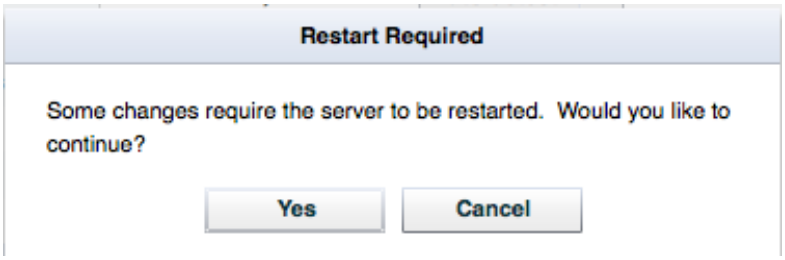
Restart Required dialog will show up. Click on the Yes button to restart the server and apply changes in the settings.



Changing the HTTPS port (Windows version only)

Enable *Host the HTTPS web client on a non-standard port* checkbox and change the port number, and click on the OK button.

Click on the Yes button in Restart Required dialog to restart netLD server.

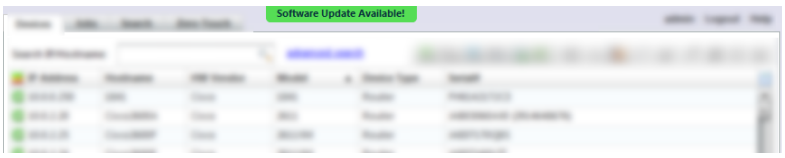


Reference: Sec. 7.1, p.230

5.2.9 Software Update

netLD automatically checks for updates and notifies if any updates are available, including adapter or manual updates. Automatic update notification needs an Internet connection.

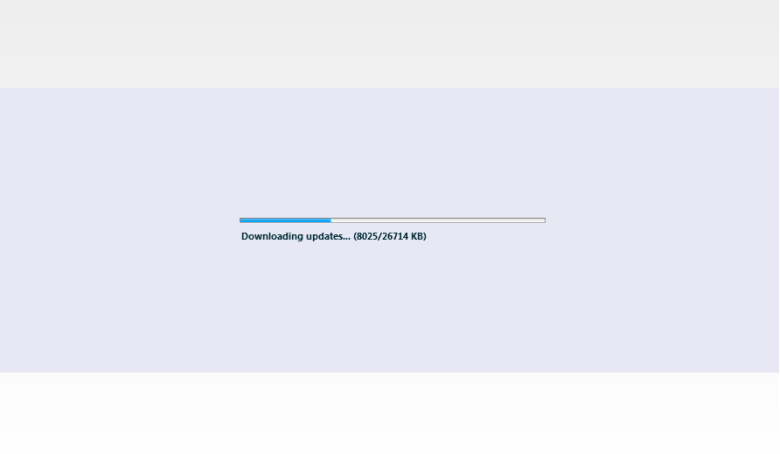
Usually you will find the update notified on the top of the screen.



To update the software explicitly,

1. Click on the *Install Update* button to update. Click on the *Yes* button to confirm starting the update.
2. Download starts automatically. When the update is complete, netLD service restarts, and then the new login screen appears.

Downloading the updates.



5.3 Help Menu

Help Menu is used to send a log, check the manual/FAQs and so on.

5.3.1 FAQ

Clicking on this menu opens FAQ page in our website.

5.3.2 Manual

Clicking on this menu opens netLD product manual.

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5.3.3 About

There are several features in *Help* → *About* and they are useful for debugging. To use the features in this section, you have to login with *Administrator* user.

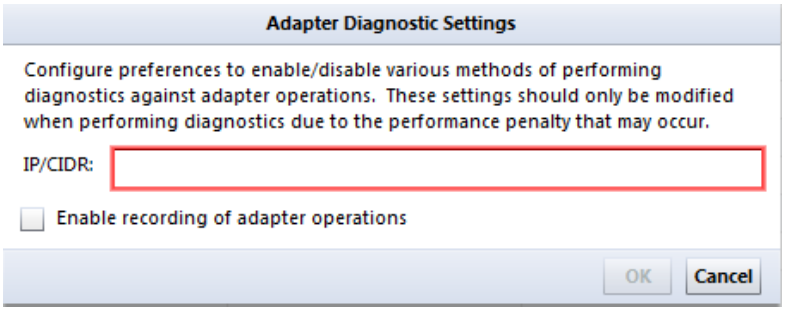
Adapter Logging

Adapter Logging feature in the *About* menu allows you to issue a log for adapter operations. It is effective only in 5 minutes and is disabled after that. It is because this feature is quite CPU intensive, and there may be significant performance drawback if someone forgot to disable the feature.

To activate the adapter logging feature, first select the *About* in Help menu.

Then click on the *Adapter Logging* button.

Enter an IP address of the target device in IP/CIDR and enable checkbox for Enable recording of adapter operations.


Adapter Diagnostic Settings
Configure preferences to enable/disable various methods of performing diagnostics against adapter operations. These settings should only be modified when performing diagnostics due to the performance penalty that may occur.
IP/CIDR:
Enable recording of adapter operations
OK
Cancel

The log file have a filename much like the following:

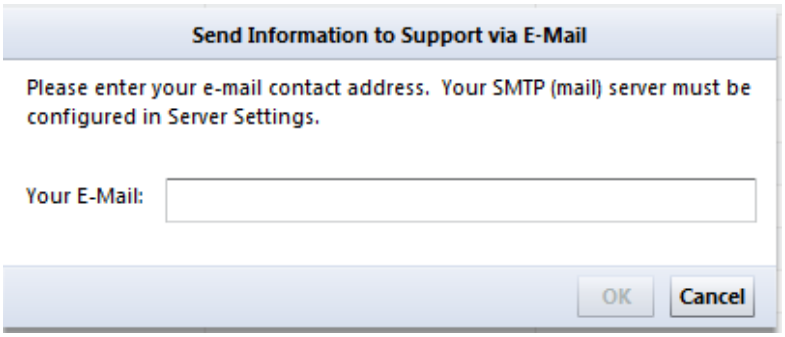
```
C:￥Program Files￥Net LineDancer￥scratch￥logs￥Switch_backup_10.0.2.3.log
```

Send Log

Send Log feature sends a set of log files to support@logicvein.com when you are in troubles. The logging feature in netLD is quite exhaustive, e.g. it creates the logs even while using the Smart Bridge feature.

1. Select the *About* in the *Help* menu.
2. Click on the *Send Log* button.

Enter your E-mail address in Your E-Mail field and click on the OK button to send the log.


Send Information to Support via E-Mail
Please enter your e-mail contact address. Your SMTP (mail) server must be configured in Server Settings.
Your E-Mail:
OK
Cancel

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5.4 Yet Other Miscellaneous Operations

We further describe the other operations hard to categorize.

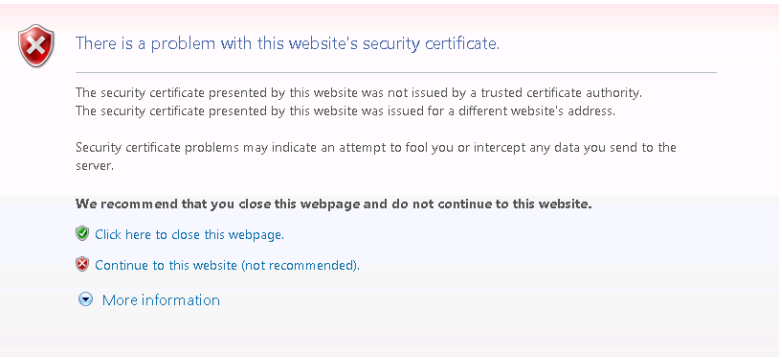
5.4.1 Security Certificate on Browsers

Since we need to access netLD server with HTTPS, security certification error is issued on a browser when you access the netLD instance. Ignoring the error and accessing netLD's interactive interface via a browser is completely safe, but you can also issue and install SSL certificate to suppress the error message. While the operation is instructed with Internet Explorer, the similar method can also be applied to the other browsers like Google Chrome and Mozilla Firefox.

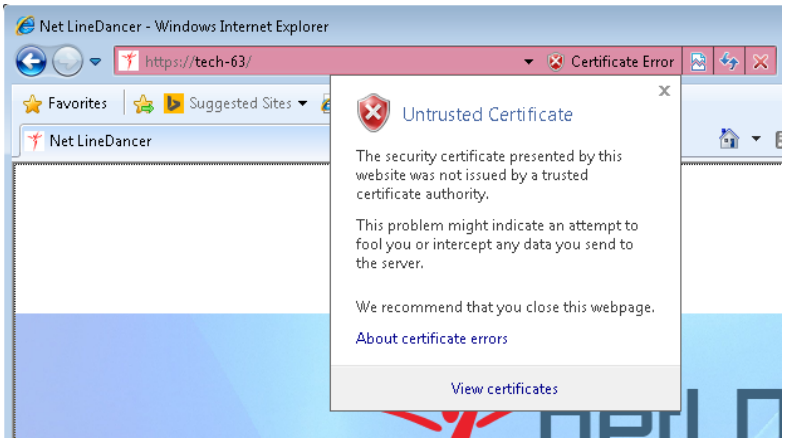
Installing SSL Certificate

This instruction is for IE only. For the other browsers, refer to the guide provided by the browser vendor.

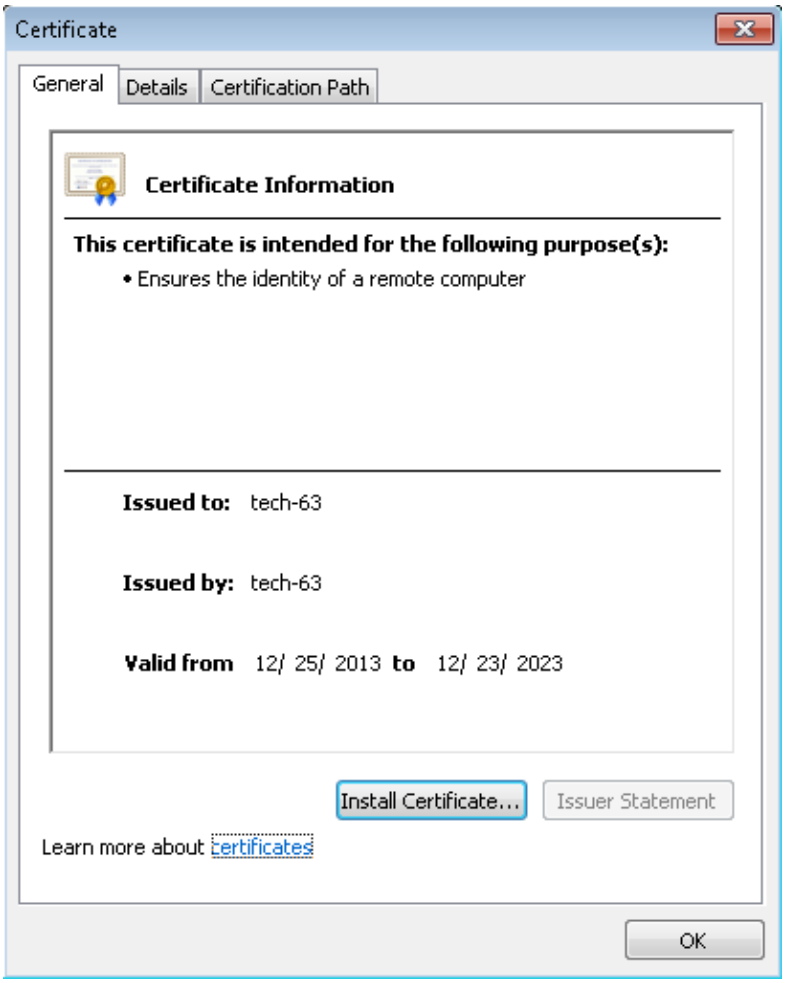
Start Internet Explorer browser and connect to netLD server, and select *Continue to this website (not recommended).*


There is a problem with this website's security certificate.
The security certificate presented by this website was not issued by a trusted certificate authority.
The security certificate presented by this website was issued for a different website's address.
Security certificate problems may indicate an attempt to fool you or intercept any data you send to the server.
We recommend that you close this webpage and do not continue to this website.
Click here to close this webpage.
Continue to this website (not recommended).
More information

Click on the *Certificate Error* to open the error message and click on *View certificates* to start an installation.


Net LineDancer - Windows Internet Explorer
https://tech-63/
Certificate Error
Favorites
Suggested Sites
Net LineDancer
Untrusted Certificate
The security certificate presented by this website was not issued by a trusted certificate authority.
This problem might indicate an attempt to fool you or intercept any data you send to the server.
We recommend that you close this webpage.
About certificate errors
View certificates

Click on the *Install Certificate* button.



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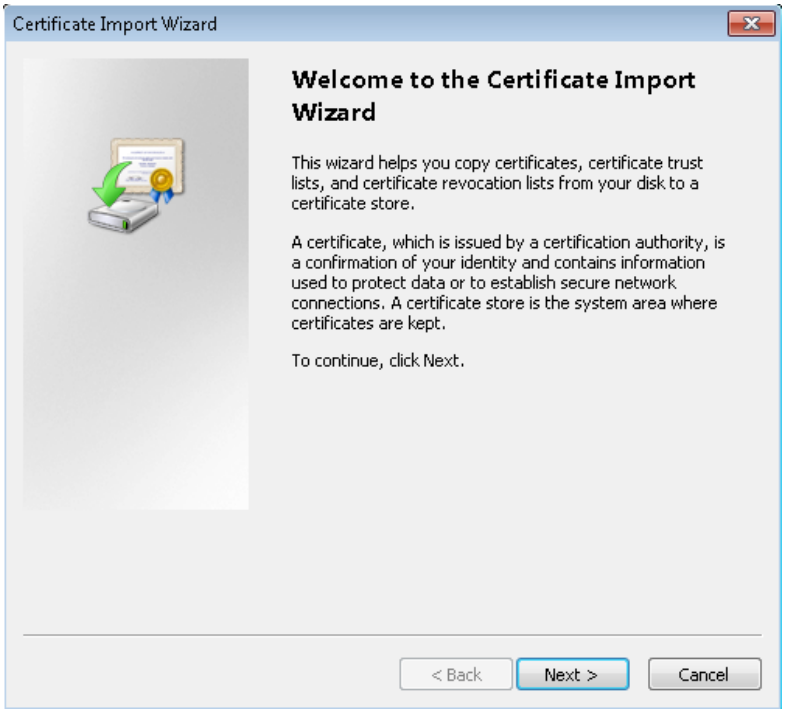
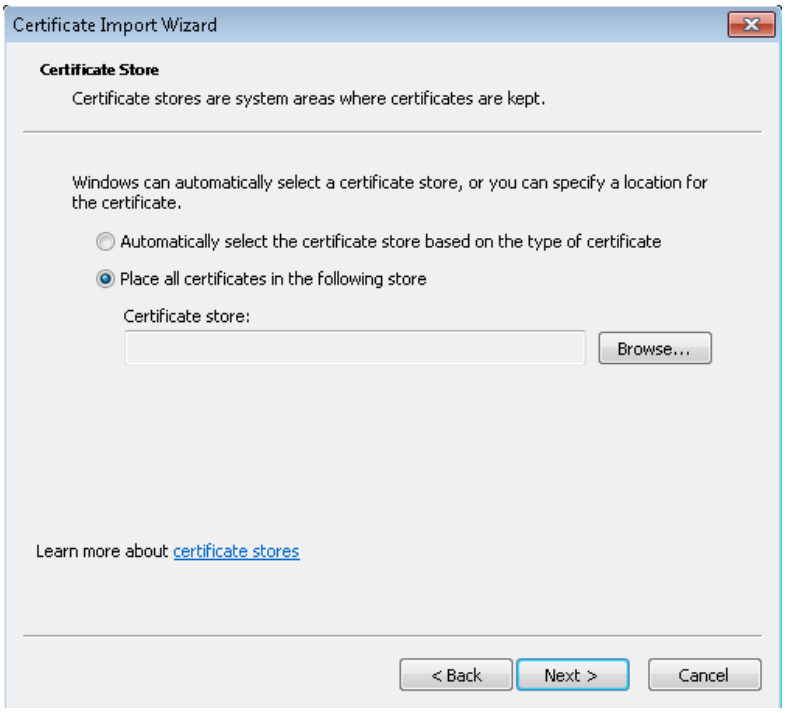
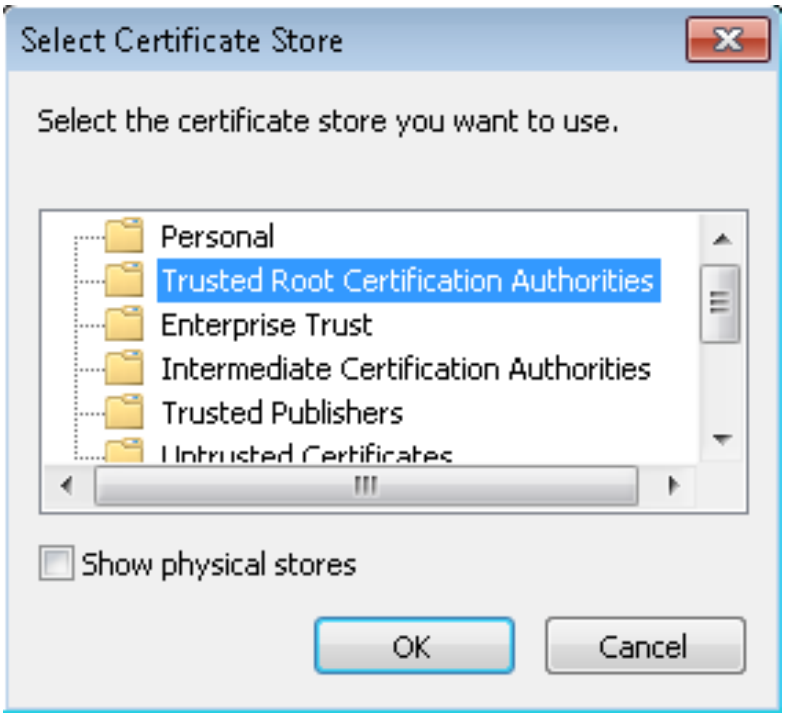
Click on the Next button


Certificate Import Wizard
Welcome to the Certificate Import Wizard
This wizard helps you copy certificates, certificate trust lists, and certificate revocation lists from your disk to a certificate store.
A certificate, which is issued by a certification authority, is a confirmation of your identity and contains information used to protect data or to establish secure network connections. A certificate store is the system area where certificates are kept.
To continue, click Next.
< Back
Next >
Cancel

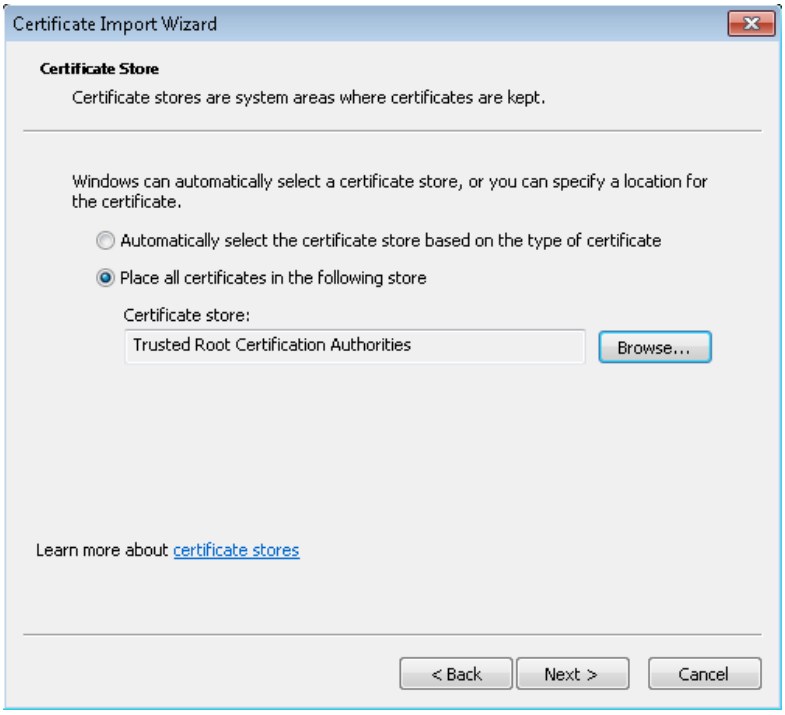
Select *Place all certificates in the following store* and click on the *Browse* button.


Certificate Import Wizard
Certificate Store
Certificate stores are system areas where certificates are kept.
Windows can automatically select a certificate store, or you can specify a location for the certificate.
Automatically select the certificate store based on the type of certificate
Place all certificates in the following store
Certificate store:
Browse...
Learn more about certificate stores
< Back
Next >
Cancel

Select *Trusted Root Certification Authorities* and click on the OK button.



Click on the Next button.


Certificate Import Wizard
Certificate Store
Certificate stores are system areas where certificates are kept.
Windows can automatically select a certificate store, or you can specify a location for the certificate.
Automatically select the certificate store based on the type of certificate
Place all certificates in the following store
Certificate store:
Trusted Root Certification Authorities
Browse...
Learn more about certificate stores
< Back
Next >
Cancel

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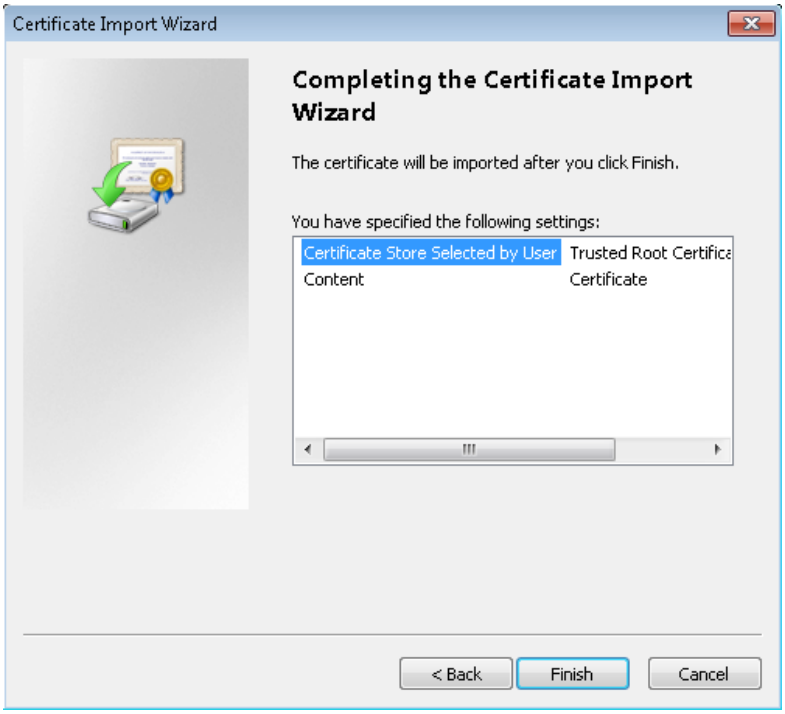
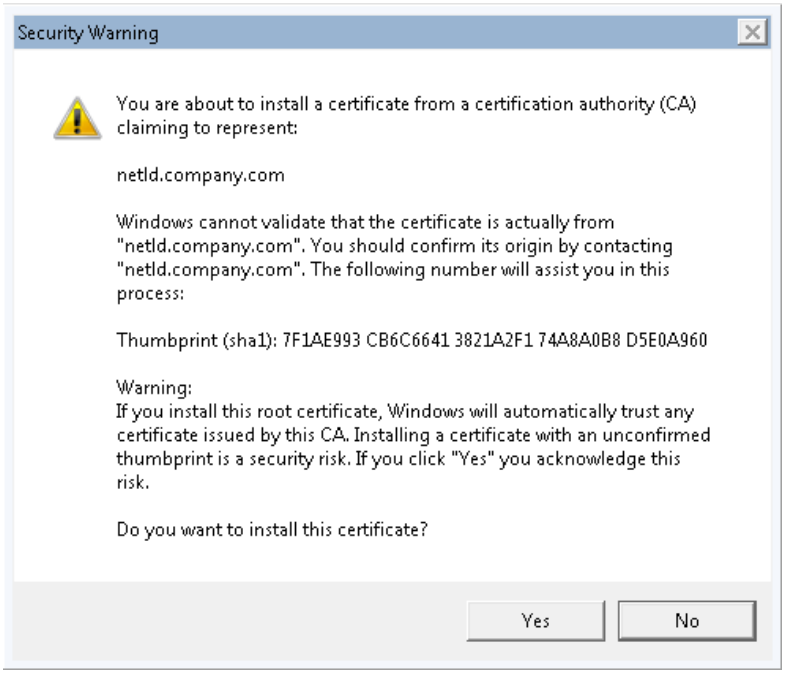
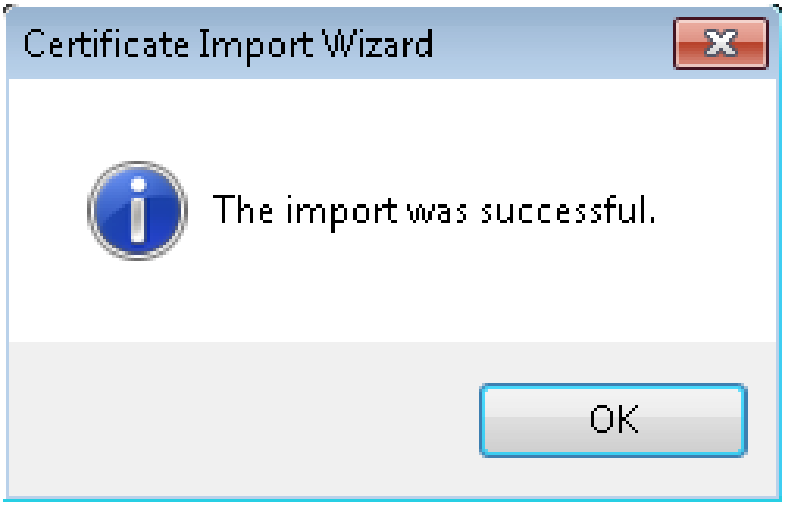
Click on the *Finish* button to save the change.



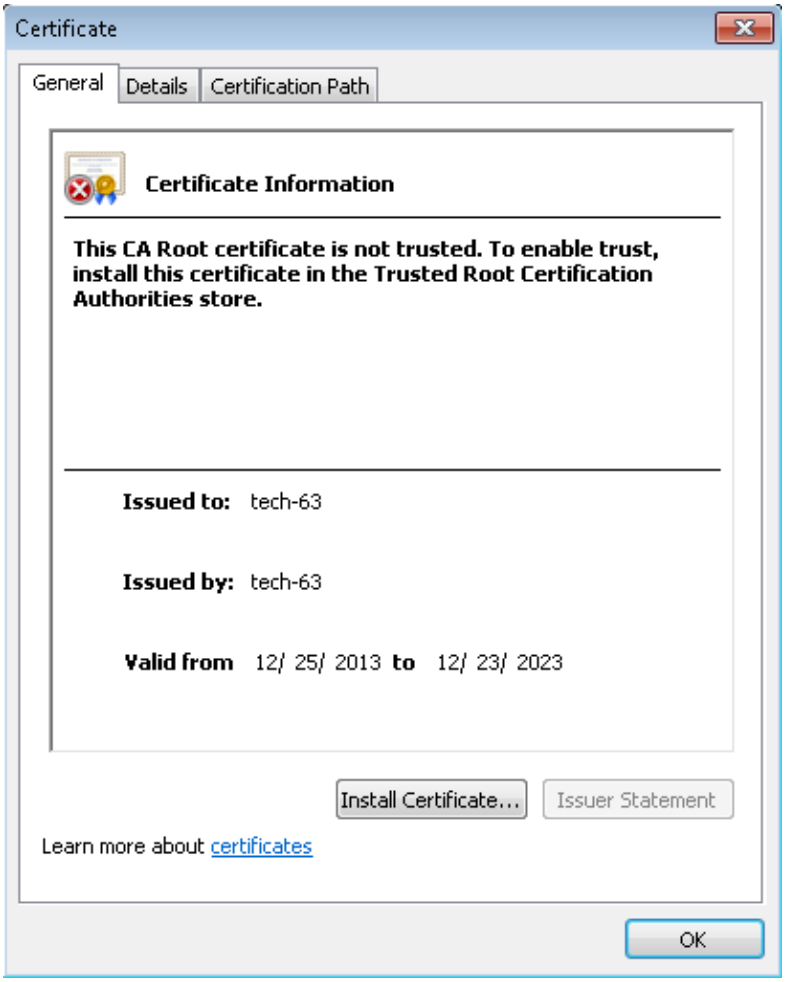
Click on the *Yes* button to install the certificate in Security Warning dialog.


Security Warning
You are about to install a certificate from a certification authority (CA) claiming to represent:
netld.company.com
Windows cannot validate that the certificate is actually from "netld.company.com". You should confirm its origin by contacting "netld.company.com". The following number will assist you in this process:
Thumbprint (sha1): 7F1AE993 CB6C6641 3821A2F1 74A8A0B8 D5E0A960
Warning:
If you install this root certificate, Windows will automatically trust any certificate issued by this CA. Installing a certificate with an unconfirmed thumbprint is a security risk. If you click "Yes" you acknowledge this risk.
Do you want to install this certificate?
Yes
No

Click on the OK button to finish the wizard.



Click on the OK button to close Certificate dialog.



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Restart Internet Explorer and access the netLD GUI again. Confirm that the Security Certificate error is not displayed.

Updating SSL Certificate

Follow the following steps to update the SSL Certificate after the netLD installation. These steps are only for updating the SSL Certificate and are not required while upgrading netLD itself.

1. Change directory to the netLD install directory directory in a command prompt. e.g. `cd c:¥Program Files¥Net LineDancer¥Java¥bin`
2. Enter the following commands to delete the existing SSL certificate. `keytool -delete -alias ziptie -keystore ../../osgi-config¥.keystore -storepass ziptie`
3. Issue a new SSL Certificate with the following command. `keytool -genkey -keyalg RSA -dname "CN=netLD-server.logicvein.com, OU=Tech, O=LogicVein, L=Kawasaki, S=Kanagawa, c=JP" -alias ziptie -keypass ziptie -keystore "../../osgi-config¥.keystore" -storepass ziptie -validity 3650`
4. Finally, restart netLD service with `net stop netld` and `net start netld`.

Each key-value pair in the step 3 has the following meaning. Change the value appropriately.

- CN – Server FQDN (Fully Qualified Domain Name)
- OU – Branch name
- O – Company name
- L – City
- S – Prefecture, State

5.4.2 Software License Key

We do not provide instructions to upgrade a software license key from the evaluation version to the paid full version, or to the superior version (even larger number of devices can be added) due to the security consideration. We provides the instruction only from the LogicVein technical support.

If you need further assistance or technical support about Net LineDancer, please fell free to contact below. We will be pleased to help you when you find any errors or ambiguities in this manual, or any questions regarding them as well. Please note that we are closed on weekends, national holidays, New Year and summer holidays in Japanese time. We accept e-mails for 24 hours but we will only reply on those business hours. Thank you for your cooperation.

LogicVein, Inc. Technical Support

Mail: support@logicvein.com

5.4.3 Resetting Client Settings

You can reset the client setting. It resets the miscellaneous status such as the checkboxes in the dialog.

1. Click on the current username located the upper right side of screen.
2. Click on the *Reset client settings* button and click on the OK button to save the change.

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Figure 5.2.8: Software Update

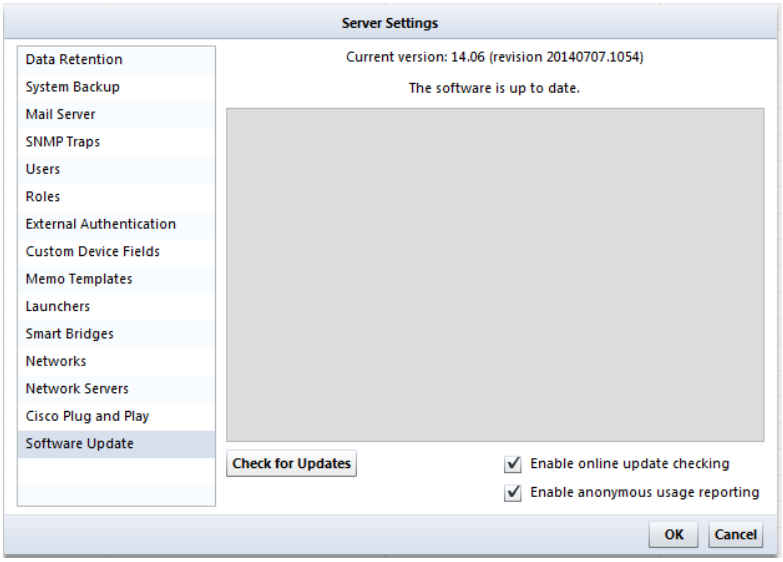
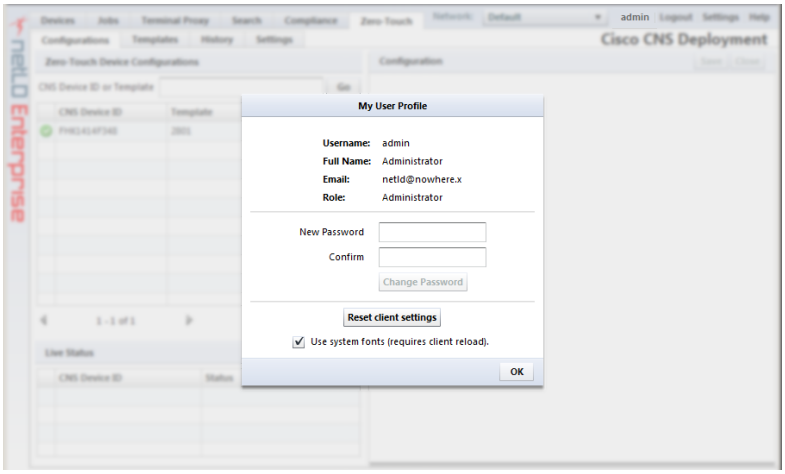


Figure 5.4.1: Resetting the client settings.



5.4.4 Upgrading netLD

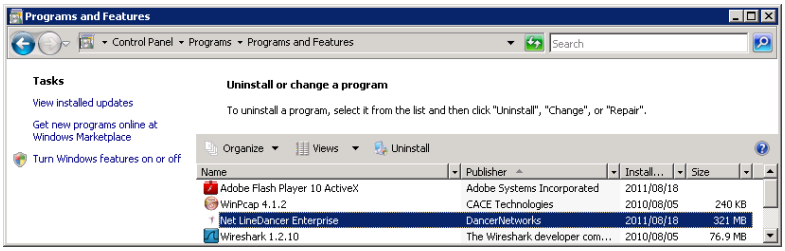
Also refer to the Sec. 5.2.9, p.205 (automatic update) section for a guide to run the automatic update via Internet. In this section, instead, we describe how to update your netLD from a binary installation.

1. Stop the netLD server first. The netLD service can be stopped from the system tray, Windows' Service Manager, or via CUI. See Sec. 2.6 for details.
2. Save the latest netLD install program to the target server and double-click on the program to start. The following procedure is just the same as that of the initial installation, except for the minor changes:
   - License registration does not appear.
   - Installation directory is not asked and confirmed.

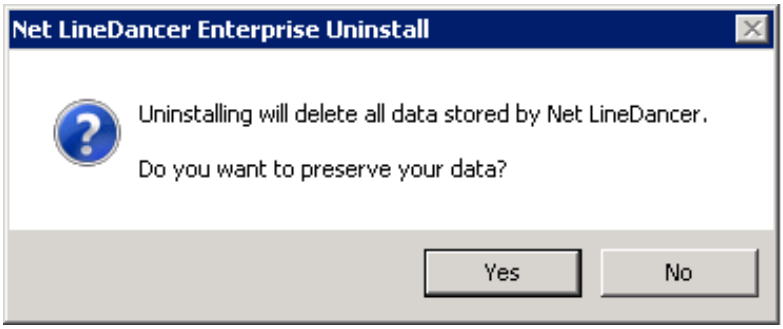
5.4.5 Uninstalling netLD

To uninstall netLD, follow the instruction below.

In the Windows' Programs and Features dialog, select Net LineDancer Enterprise from the Name list and click on the Uninstall button.



Then the following message is displayed to confirm the uninstallation. Click on the Yes button if you want to keep the configuration data of netLD or click on the No button if you want to uninstall everything including all configurations.


Net LineDancer Enterprise Uninstall
Uninstalling will delete all data stored by Net LineDancer.
Do you want to preserve your data?
Yes
No

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If you choose Yes, the configuration is saved in the original installation directory. Moving/copying the directory to the other devices or servers will help you migrate to the other environment.

After that,

- Click on the Next button.
- Click on the Uninstall button.
- Click on the Next button.
- Select Restart Now option and click on the Finish button to close the uninstallation wizard.

Uninstalling Smart Bridge

The process is straightforward and same as uninstalling netLD.

1. In the Windows Programs and Features dialog, select Net LineDancer Smart Bridge from the Name list and click on the Uninstall button.
2. Confirm the directory to delete and click on the Uninstall button to start the uninstallation process.
3. When uninstall process is completed, the following message will be displayed. Click on the Close button to end this wizard.

Chapter 6

FAQ

In this chapter, we answer the frequently asked question collected from the past user feedback.

If you need further assistance or technical support about Net LineDancer, please fell free to contact below. We will be pleased to help you when you find any errors or ambiguities in this manual, or any questions regarding them as well. Please note that we are closed on weekends, national holidays, New Year and summer holidays in Japanese time. We accept e-mails for 24 hours but we will only reply on those business hours. Thank you for your cooperation.

LogicVein, Inc. Technical Support

Mail: support@logicvein.com

6.1 Devices are not successfully discovered nor added to the device list

Confirm the followings:

1. SNMP is enabled on each device.
2. SNMP community name of the device is consistent with that of the registered element in the netLD inventory.
3. No firewall or antivirus software shuts the PING/SNMP access from netLD.

See Also: Sec. 3.3.1 (Adding devices)

6.2 Backup Fails!

Please follow the instruction below precisely:

1. Confirm again the credential information set in netLD (username, password, community names, etc.) matches the configurations in the device.
2. Confirm again the protocols enabled for the device in netLD are also enabled on the device.
3. Confirm again firewall/antivirus software does not block the required ports.
4. Confirm again NO TWO network groups share the same IP address.
5. Confirm the cable connection again.

If the backup still fails after all these efforts, get the log files by performing steps in Adapter Logging (Sec. 5.3.3, p.207) and send it to our technical support (support@logicvein.com). Thank you for your patience.

See Also: Sec. 2.3, p.31 (Credentials, Network Groups, Protocols), Sec. 3.1, p.42 (Credentials), Sec. 2.3.2, p.33 (Protocols), Sec. 5.3.3, p.207 (Adapter Logging)

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6.3 The wrong IP address is displayed during the discovery

netLD choose one IP address if the device has multiple addresses. Therefore, the detected address may be different than the one you expected. To use the other address for the device, add the device manually by using *Inventory* → *Add New Device*. During the discovery, it uses the following algorithm to guess the management IP address.

1. Runs `show interface` command on each device and gets the response.
2. Reads the result from the top, and search for the interface description. Once it finds an interface, it checks if it is a software loopback. If yes, it also reads the IP address written in the result.
3. Sends a ping to that address.
4. If the device responds, netLD selects the IP address as a management address. End the algorithm.
5. If the device does not respond, netLD goes back to 2 to try another address.
6. If none of the address responds, then pings to the non-loopback interfaces (similar to 3-5.) and selects the first IP address that responds.

An example of a result of running `show Interface` command on a device:

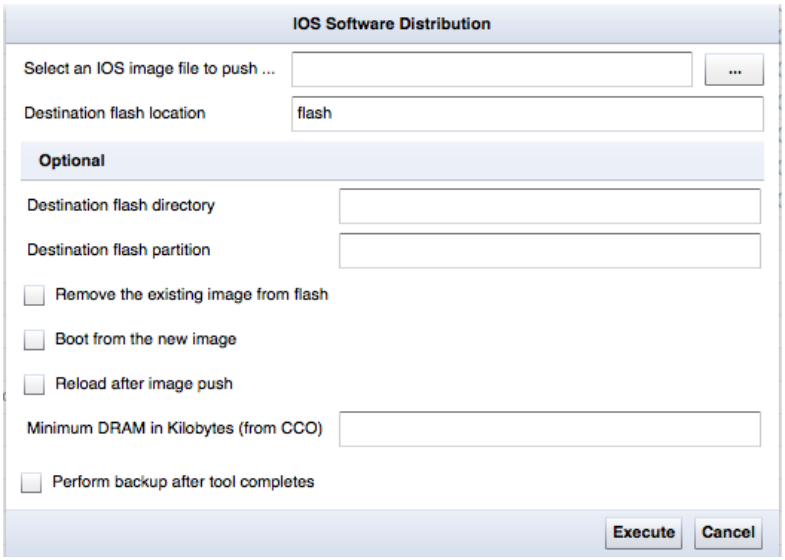
```
FastEthernet0/0 is up, line protocol is up
  Hardware is AmdFE, address is 000c.cec6.eae0 (bia 000c.cec6.eae0)
  Internet address is 10.0.0.216/24
  MTU 1500 bytes, BW 100000 Kbit, DLY 100 usec,
  ...

FastEthernet0/1 is up, line protocol is up
  Hardware is AmdFE, address is 000c.cec6.eae1 (bia 000c.cec6.eae1)
  Internet address is 10.0.1.1/24
  ...
```

In the case above, since none of the interfaces are loopback interfaces, netLD jumps to 6, and sends a ping to `10.0.0.216` first. If the device responds, it takes it as a management address. Otherwise it sends a ping to `10.0.1.1`. If `10.0.1.1` does not respond, it means that the IP address has disappeared completely in the network. Please review the SNMP settings and other configurations on the device by connecting to the device directly e.g. via the serial port.

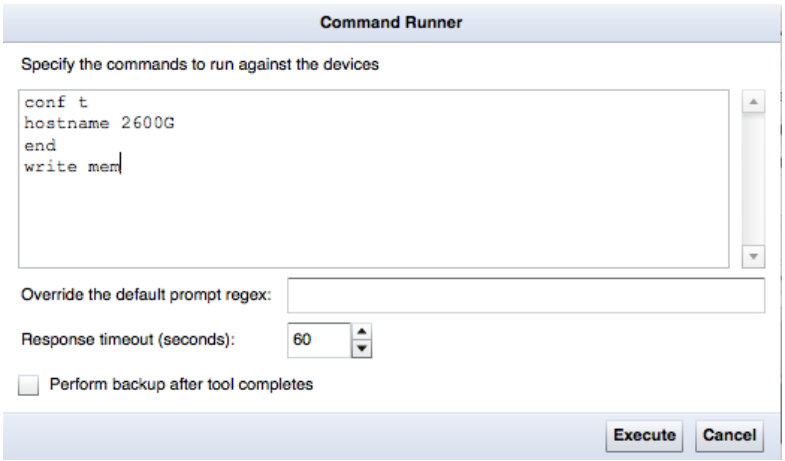
6.4 Is it possible to upgrade the firmwares of our devices at once?

Yes. Use Command Runner tool (Sec. 3.6.1, p.80) to run the command for upgrading the firmware on the target devices. For Cisco devices, *Change* → *IOS Software Distribution* (Sec. 3.6.10, p.85) is convenient. Note that FTP and TFTP servers are required.

For Cisco devices : Change → IOS Software Distribution



For other devices : Change → Command Runner



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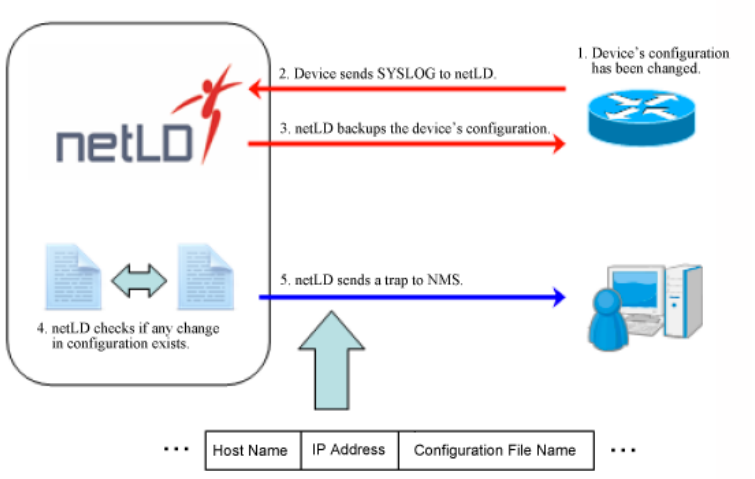
6.5 Is it possible to send a trap when the configurations were changed?

Yes. netLD sends a trap to notify such event as a configuration change. (Sec. 4.4.2, p.183)

The Trap information sent to NMS contains hostname, IP address, and configuration file name of the device.

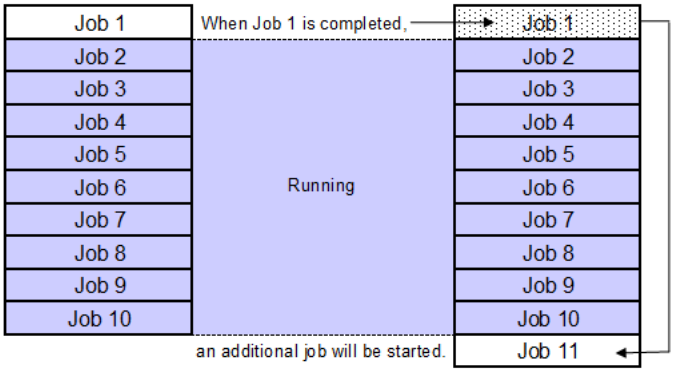

netLD
1. Device's configuration has been changed.
2. Device sends SYSLOG to netLD.
3. netLD backups the device's configuration.
4. netLD checks if any change in configuration exists.
5. netLD sends a trap to NMS.
Host Name
IP Address
Configuration File Name

6.6 How many jobs can be run at the same time?

netLD runs up to 10 jobs at the same time by default. If the number of the current jobs exceeds 10, they are handled sequentially. This value is automatically configured by netLD, by analyzing the system performance of the server. Careful tuning is required, and so the manual configuration is not available. If you do need to configure this value, contact the technical support.

Even though the larger number might seem to allow for faster processing, the actual speed depends on the computational power and the network speed. Generally the number of jobs should not be too much because too many jobs would flood the network with lots of packets and consume the bandwidth.

Running a job concurrently and/or in parallel.



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6.7 Error "No connection-based protocol specified..." occurs when I try to run a change tool

This error occurs when "Credential and Protocol cache" was cleared by editing these settings. To solve this issue, run a backup on the device(s) before running change tool.

Chapter 7

Data

7.1 Port Usage

The ports used by netLD are listed below. If you need to access the target devices through a firewall, configure the transmission policy of the firewall depending on which protocols to use.

Function	Protocol	Port	UDP/TCP	Direction from netLD
Cisco PnP	DHCP	67	UDP	netLD ← dest
		68	UDP	netLD → dest
	HTTP	80	TCP	netLD ← dest
	TFTP	69	UDP	netLD ← dest
	ICMP	-	-	netLD ← dest
Automatic Discovery	SSH, Telnet	22,23	TCP	netLD → dest
	SNMP	161	UDP	netLD → dest
	ICMP	-	-	netLD → dest
Setting Upload (restoring configurations)	TFTP	69	UDP	netLD ← dest
Setting change tool [1]	SSH, Telnet	22,23	TCP	netLD → dest
Trap sending	SNMP	162	UDP	netLD → dest
Real-time change detection	Syslog	514	UDP	netLD ← dest
Backup tool [2]	SSH, Telnet	22,23	TCP	netLD → dest
	SNMP	161	UDP	netLD → dest
	TFTP	69	UDP	netLD ← dest
	FTP	21	TCP	netLD ← dest
Terminal Log				
(Windows version) [3]	SSH	22	TCP,UDP	netLD ← Client
(Linux version)	SSH	2222	TCP,UDP	netLD ← Client
Client(Web Browser) [4]	HTTPS	443	TCP	netLD ← client (GUI)
Smart Bridge	HTTPS	10443	TCP	netLD → Smart Bridge
RADIUS Authentication	RADIUS	1812	UDP	netLD ↔ Radius Server

[1] Configured CLI protocols are used.

[2] The appropriate configuration depends on which models of devices are in use. For example,

1. Adapter for IOS: CLI (Telnet, SSH)only, or both CLI and TFTP.
2. Adapter for Alaxala: CLI (Telnet, SSH), FTP or SNMP.

[3] On Windows version, the port usage can be modified in *Settings* window. See Sec. 5.2.8, p.205.

[4] On Windows version, the port usage can be changed in *Settings* window. See Sec. 5.2.8, p.205.

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7.2 Directories

netLD creates the following directory trees under the installation directory.

Directory	Description
adapters	Device interaction adapters.
backups	Automated daily backups.
core	Core service code.
crates	Core service code.
derby	Apache Derby database.
Java7	Java 7 Runtime distribution.
legal	Open Source library licenses and legal acknowledgements.
lucene	Apache Lucene full-text search indexes.
migration	Version upgrades scripts.
osgi-config	Internal configuration files.
Perl	Perl Runtime distribution.
pgsql	PostgreSQL Database.
real-time	Real-time change detection scripts.
reports	Internal report definition files.
scratch	Internal temporary file storage directory.
sql	Apache Derby database initialization files.
tmp	Java 7 temporary file storage directory.
tools	Device tool scripts.
ui	Core service code.
update	Online update temporary storage directory.
ztwrapper	Net LineDancer service executable and configuration.

7.3 Permissions Configurable in Roles

7.3.1 List of Permissions

Here is the list of configurable permissions.

No.	Descriptions of permissions
1	view compliance rule sets and policies.
1-1	create/update/delete a compliance policy.
1-2	create/update/delete a compliance rule set.
2	view device configurations.
3	administer credentials and protocols.
4	create/update/delete device information in the inventory.
5	assign names to custom fields.
6	tag/untag in the inventory.
7	administer scheduler filters.
8	run a backup job.
8-1	create/update/delete a backup job.
9	run a device discovery job.
9-1	create/update/delete a device discovery job.
10	run a tool.
10-1	create/update/delete a tool job.
10-2	run a tool which changes a device configuration.
11	run a report.
11-1	create/update/delete a report job.
12	run a restore job.
13	run a neighbor collection job.
13-1	create/update/delete a neighbor collection job.
14	run a Smart Change job.
14-1	create/update/delete a Smart Change job.
15	create/update/delete URL launchers.
16	create/update/delete memos.
17	create/update/delete managed networks.
18	create/update/delete Cisco PnP configurations.
19	create/update/delete Cisco PnP templates.
20	administer security settings.
21	create/update/delete inventory tags.
22	login using the terminal server proxy.
22-1	automatically log in to devices from the terminal server proxy.
23	view other user's terminal proxy logs.

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7.3.2 Permission vs Available Operations

	1	1-1	1-2	2	3	4	5	6	7	8	8-1	9	9-1	10	10-1	10-2	11	11-1	12	13	13-1	14	14-1	15	16	17	18	19	20	21	22	22-1	23
Main Menu																																	
Credentials					O																												
Protocols					O																												
Discover Devices												O																					
Add Devices						O	O																										
Device Tags																					O									O			
Scheduler Filters									O																								
OS Images																O																	
Server Settings						O	O					O																	O				
Devices																																	
Search IP/Hostname	O	O	O	O	O	O	O	O	O	O	O		O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Advanced search	O	O	O	O	O	O	O	O	O	O	O		O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Run Backup										O	O																						
Command runner																O																	
Read tool														O	O	O																	
Change tool																O																	
Smart Change																						O	O										
Collect neighbor data																				O	O												
Create a new job											O		O		O			O			O		O										
Terminal log																															O	O	O
Export Inventory	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Export configurations	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Display configurations				O																													
Display neighbors	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Run a report																																	
Compare configurations																																	
Launch a URL	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Device IP, Adapter map						O																											
Delete the device						O																											
Associate tags								O													O									O			
Dissociate tags								O													O									O			

	1	1-1	1-2	2	3	4	5	6	7	8	8-1	9	9-1	10	10-1	10-2	11	11-1	12	13	13-1	14	14-1	15	16	17	18	19	20	21	22	22-1	23
Jobs																																	
Open Results															O			O			O		O										
Compare Results															O			O			O		O										
Open Job											O				O			O			O		O										
Delete Job											O				O			O			O		O										
Run Now										O					O			O			O	O	O										
New Job															O			O			O		O										
Terminal Proxy																																	
Log in																														O	O		
Auto log in																															O		
Search																																	
Configuration Search																																	
Switch Port Search	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
ARP Search	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Compliance																																	
R compliance	O	O	O																														
R/W rules			O																														
R/W policies		O	O																														
Cisco PnP																																	
Configurations																											O						
Templates																												O					
History																											O	O					
Settings(DHCP Server)																													O				

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7.4 Compliance Rules Provided by Default

These are the complete set of rules provided by default.

- IOS Interface Auto-Duplex/Speed
  - Violation if interface settings include followings:
    - no ip address: Stop on match
    - shutdown command: Stop on match
    - duplex auto:Violation if not matched
    - speed auto: Violation if not matched
- IOS Secure Enable Passwords
  - Violation if not matched.
    - Service password-encryption:
    - enable secret: Violation if not matched.
- IOS Telnet Restricted Access
  - Violation if line vty setting:
    - access-class : Violation if no "variables" matched
- IOS SSH-only Restricted Access
  - In line vty settings,
    - transport input ssh: violation if not matched
    - transport input telnet: violation on matched
- IOS Disabled Unneeded Service
  - Violation if the followings are not matched
    - no service tcp-small-servers
    - no service udp-small-servers
    - no ip bootp server
    - no service finger
    - no ip source-route
    - no ip identd
    - no ip http server
- IOS Session Idle Timeout
  - line vty Settings
    - exec-timeout minutes: Violation if no variables matched

7.5 Recommended System Requirements

Minimum Requirements for 3,000 devices:

Operation Systems	
Windows(64bit only)	Windows Server 2008 SP2
	Windows Server 2008 R2
	Windows Server 2012
Linux(64bit only)	Cent OS 5/6
	RedHat 5/6 or later
Hardware Requirements	
CPU Core	Minimum 4
Memory	Minimum 2GB
HDD	120GB 10K RPM RAID1

Minimum Requirements for 12,000 devices:

Windows(64bit only)	Windows Server 2008 SP2
	Windows Server 2008 R2
	Windows Server 2012
Linux(64bit only)	Cent OS 5/6
	RedHat 5/6 or later
CPU Core	Minimum 6
Memory	Minimum 8GB
HDD	300GB 10K RPM RAID1

On the Client side, you can browse Net LineDancer Server with:

- Internet Explorer 7 or later
- FireFox
- Safari

or the other conforming browser implementation.

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7.6 Updates in version 13.08

- Draft Configurations Feature:
  - Support for creating configuration drafts from existing device configurations, or importing from text files.
  - Draft configurations can be edited directly and can then be pushed to the device (either running or startup configuration).
  - Drafts can also be compared to existing configurations to verify that only the parts you expect to change are affected.
- Change Advisor Feature:
  - This is new feature that is unique in the industry.
  - The Change Advisor can work with existing configurations or draft configurations.
- Tera Term Integration
  - Working in concert with the Terminal Proxy feature, which allows automated login to devices and capture of terminal sessions, we have added the ability to simply right-click on a device in the inventory list and open a Tera Term session that jumps directly into the device – logging in automatically for you.
- Cisco PnP Feature(optional)
  - We added the ability to create run after the Cisco PnP function, to back up add the inventory automatically.
- Add Supported Operating Systems
  - Windows Server 2012
  - Linux Cent OS / later than RedHat 5.x/6.x

7.7 The List of Available Device Adapters

Here are the lists of available devices at the time of this document (for different versions of netLD). If any of your devices are not listed above, please contact the Sales Team. LogicVein developer team starts the development as soon as possible, and your devices are supported usually within 3 weeks.

Figure 7.7.1: Supported Device List, version 13.08

Adtran Netvanta	Alaxala AXS
Alcatel-Lucent OmniSwitch	Allied Telesis 8700SL Series M
Allied Telesyn Telesis X Series M	Allied Telesyn Switches
Allied Telesis CentreCOM FS917M	Alteon AD3
Anritsu PureFlow	APC smart-UPS
Apresia	Aruba ArubaOS
Blue Coat ProxySG	Brocade Silkworm
Check Point SecurePlatform	CheckPoint VPN1 Edge Firewalls
Cisco ACNS Platforms	Cisco Airespace Controller
Cisco CatOS	Cisco CS500
Cisco CSS/ArrowPoint	Cisco GSS Appliances
Cisco IOS	Cisco LocalDirector
Cisco Nexus	Cisco SAN-OS
Cisco Security Appliances	Cisco VPN
Cisco VxWorks	Cisco WAAS Platforms
Cisco WLSE	Citrix NetScaler
Dell PowerConnect	D-link DGS
Enterasys Matrix	Enterasys SecureStack Switches
Enterasys SSR	Enterasys VerticalHorizon
Extreme Extremeware	Extreme XOS
F5 3DNS/BIG-IP v4	F5 BigIP
Fortinet Fortigate	Foundry EdgeIron
Foundry FastIron	Fujitsu SRS
H3C	HP ProCurve
HP ProCurve M	Juniper DX
Juniper JUNOS	Juniper ScreenOS
NEC IX	NEC WA1020
Nortel BayRS	Nortel BayStack
Nortel Contivity	Nortel Passport
Nortel Passport-1600	Nortel Tiara
Paloalto PA-500	Vyatta OFR
Yamaha RT/RTX	

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7.7.1 Supported Device List - version14.06

Figure 7.7.2: Supported Device List, part 1

Vendor	Model/series/Operation System
A10 Networks	ACOS
ADTRAN	Netvanta
ALAXALA Networks	AX-S Series
Alcatel-Lucent	OmniSwitch
Allied Telesis	8700SL Series
	X Series
	FS900M
Allied Telesyn	Switches
Alteon	AD3
Anritsu	PureFlow GS1
APC	Smart-UPS
Aruba Networks	ArubaOS
BlueCoat	ProxySG
Brocade	Fabric OS
Check Point	SecurePlatform
	VPN1 Edge Firewalls

Figure 7.7.3: Supported Device List, part 2

Vendor	Model/series/Operation System
Cisco Systems	ACNS Platforms
	ArrowPoint
	CatOS
	CS500
	GSS Appliances
	IOS
	Linksys
	LocalDirector
	MDS Series SAN-OS
	Nexus
	Security Appliances
	VPN 3000 Series
	VxWorks
	WAAS Platforms
	Wireless LAN Controller
	WLSE
Citrix Systems	NetScaler
Dell	PowerConnect
D-Link	DGS Series
Enterasys	Matrix
	SecureStack Switches
	SSR
	VerticalHorizon
Extreme	Extremeware
	XOS

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Figure 7.7.4: Supported Device List, part 3

Vendor	Model/series/Operation System
F5 Networks	BIG-IP
	3-DNS
Fortinet	FortiGate
Foundry	EdgeIron
	FastIron
Fujitsu	SR-S Series/Si-R Series
Furukawa electric	FX Series
H3C	Switches
Hitachi Metals	Apresia
HP	ProCurve M
	ProCurve
Huawei	VRP OS
Juniper Networks	DX
	Junos
	ScreenOS
	Wireless LAN Controller
NEC	IX Series
	WA Series
Nortel	Accelar
	BayRS
	BayStack
	Contivity
	Passport-1600
	Passport
	Tiara
Palo Alto Networks	PA-500 Series
Vyatta	OFR
Yamaha	RT/RTX

7.7.2 IOS Software Distributing Exception

You can update or distribute Cisco IOS software images to devices by Net LineDancer except the following devices that are started up with flash. For more information, please contact support@logicvein.com.

- Cisco 1600
- Cisco 2500
- Cisco AS5200

7.7.3 Getting the Latest Adapter Information

Also, the latest information can be obtained in our website. We provide a more detailed version of the above list, *Supported Device and Feature Matrix*.

- http://www.logicvein.com/product/device.html
- http://www.logicvein.com/product/pdf/matrix.pdf

7.8 Contacts

If you need further assistance or technical support about Net LineDancer, please fell free to contact below. We will be pleased to help you when you find any errors or ambiguities in this manual, or any questions regarding them as well. Please note that we are closed on weekends, national holidays, New Year and summer holidays in Japanese time. We accept e-mails for 24 hours but we will only reply on those business hours. Thank you for your cooperation.

LogicVein, Inc. Technical Support

Mail: support@logicvein.com

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Chapter 8

Appendices

In this chapter, we describe:

1. the cron expression language and
2. the guide to set up Windows Active Directory on Windows Server 2012.

8.1 Cron tutorial

This section introduces how to use cron to set job schedule in Net LineDancer. Most of the contents in this section are quoted from cron4j website (http://www.sauronsoftware.it/projects/cron4j/).

cron4j is a scheduler for the Java platform which is very similar to the UNIX cron daemon. With cron4j you can launch, from within your Java applications, any task you need at the right time, according to some simple rules.

8.1.1 Scheduling patterns

A UNIX crontab-like pattern is a string split in five space separated parts. Each part is intended as:

1. **Minutes** sub-pattern. During which minutes of the hour should the task been launched. The values range is from 0 to 59.

2. **Hours** sub-pattern. During which hours of the day should the task been launched. The values range is from 0 to 23.

3. **Days of month** sub-pattern. During which days of the month should the task been launched. The values range is from 1 to 31. The special value "L" can be used to recognize the last day of month.

4. **Months** sub-pattern. During which months of the year should the task been launched. The values range is from 1 (January) to 12 (December), otherwise this sub-pattern allows the aliases "jan", "feb", "mar", "apr", "may", "jun", "jul", "aug", "sep", "oct", "nov" and "dec".

5. **Days of week** sub-pattern. During which days of the week should the task been launched. The values range is from 0 (Sunday) to 6 (Saturday), otherwise this sub-pattern allows the aliases "sun", "mon", "tue", "wed", "thu", "fri" and "sat". The star wildcard character is also admitted, indicating "every minute of the hour", "every hour of the day", "every day of the month", "every month of the year" and "every day of the week", according to the sub-pattern in which it is used. Once the scheduler is started, a task will be launched when the five parts in its scheduling pattern will be true at the same time.

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8.1.2 Some examples:

```
5 * * * *
```

This pattern causes a task to be launched once every hour, at the beginning of the fifth minute (00:05, 01:05, 02:05 etc.).

```
* * * * *
```

This pattern causes a task to be launched every minute.

```
* 12 * * Mon
```

This pattern causes a task to be launched every minute during the 12th hour of Monday.

```
* 12 16 * Mon
```

This pattern causes a task to be launched every minute during the 12th hour of Monday, 16th, but only if the day is the 16th of the month. Every sub-pattern can contain two or more comma separated values.

```
59 11 * * 1,2,3,4,5
```

This pattern causes a task to be launched at 11:59AM on Monday, Tuesday, Wednesday, Thursday and Friday. Values intervals are admitted and defined using the minus character.

```
59 11 * * 1-5
```

This pattern is equivalent to the previous one. The slash character can be used to identify step values within a range. It can be used both in the form */c and a-b/c. The subpattern is matched every c values of the range 0,maxvalue or a-b.

```
*/5 * * * *
```

This pattern causes a task to be launched every 5 minutes (0:00, 0:05, 0:10, 0:15 and so on).

```
3-18/5 * * * *
```

This pattern causes a task to be launched every 5 minutes starting from the third minute of the hour, up to the 18th (0:03, 0:08, 0:13, 0:18, 1:03, 1:08 and so on).

```
*/15 9-17 * * *
```

This pattern causes a task to be launched every 15 minutes between the 9th and 17th hour of the day (9:00, 9:15, 9:30, 9:45 and so on... note that the last execution will be at 17:45). All the fresh described syntax rules can be used together.

```
* 12 10-16/2 * *
```

This pattern causes a task to be launched every minute during the 12th hour of the day, but only if the day is the 10th, the 12th, the 14th or the 16th of the month.

```
* 12 1-15,17,20-25 * *
```

This pattern causes a task to be launched every minute during the 12th hour of the day, but the day of the month must be between the 1st and the 15th, the 17th, or the 20th and the 25. Finally cron4j lets you combine more scheduling patterns into one, with the pipe character:

```
0 5 * * *|8 10 * * *|22 17 * * *
```

This pattern causes a task to be launched every day at 05:00, 10:08 and 17:22.

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8.2 Setting up Active Directory on Windows Server 2012

A RADIUS server can be configured on Windows Server 2012 using *Active Directory* and *Network Policy Server*.

8.2.1 Installation

Active Directory and *Network Policy Server* can be installed by going to the *Server Manager* and in the *Dashboard* and clicking *Add roles and features*.

8.2.2 Configuration

1. Network Policy Server
   (a) Top node "NPS" → Right click → Register server in Active Directory
   (b) RADIUS Clients → Right click → New
      i. Friendly name : anything
      ii. Address: netLD server IP address
      iii. shared secret
      iv. OK
   (c) Network Policies → Right click → New
      i. Policy name: anything
      ii. Next
      iii. Conditions → Add → User Groups → Add → Add Groups → Domain Users
      iv. Next
      v. Permission, leave defaults (Access Granted)
      vi. Next
      vii. Authentication Methods → check: Unencrypted authentication
      viii. Next
      ix. Constraints, leave defaults
      x. Next
      xi. Settings → RADIUS Attributes → Standard → Add...
         A. Attribute: Filter-Id → Add...
         B. Attribute Information → Add..
         C. String value: 'role:Administrator'
         D. OK
      xii. OK
   (d) Close
2. Next
3. Finish

This configuration allows netLD users to authenticate as a domain user and will grant the user the Administrator role. You can create any number of Network Policies; each one can represent a different group of users with different RADIUS attributes applied. For example, if you have two roles, Administrator and Operator, you can create one Network Policy for each and specify the Filter-Id appropriately for each.

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